ANNEX 1: DRAFT NUTRITION EDUCATION MODULES FOR THE CSVS

International Institute of Rural Reconstruction;

;

IDRC Grant/ Subvention du CRDI: 108748-001-Climate and nutrition smart villages as platforms to address food insecurity in Myanmar

Modules for Nutrition Education in the Climate Smart Villages in Myanmar

Purpose of the Modules

Food-based nutrition interventions, including nutrition education programs, offer a potentially sustainable approach to reducing multiple nutritional deficiencies, but they are not well evaluated in developing countries. Development of a Community-Based Nutrition Program is initiated by the International Institute of Rural Reconstruction (IIRR), with the support from IDRC and CGIAR global research program on climate change, agriculture and food security (CCAFS)and other local NGO partners. The organization conducted baseline studies in four villages in different agroecological zones in Myanmar in 2018 to address poverty, hunger and related issues of community development and local governance. Based on the results, moderate dietary diversity was identified in climate smart villages based on the nutrition-related beliefs, knowledge, attitudes and practices.

Therefore, culturally appropriate nutrition education workshops are developed and implemented to reinforce specific nutrition-related practices or behaviors, to encourage the use of agricultural biodiversity to improve dietary diversity and to improve existing dietary habits and food choices by creating a motivation for change among local people in order to promote their quality of life and to contribute to health promotion of the population in the community as a whole where programs and services are delivered.

Program components

1) Community Nutrition Screening
2) Agriculture and Nutrition
3) Promoting healthy eating
    i. Food groups in your diet
    ii. Local food sources of micronutrients
4) Promotion of breastfeeding and appropriate complementary feeding
5) Recipe demonstrations
6) Improved sanitation practices

Introduction

The narrowing of the food base becomes a global phenomenon. Although it is generally believed that poverty is a major determinant of nutritional deficiency, farming system interventions have not effectively documented the way in which the use of indigenous crops by poor communities can simultaneously achieve the outcomes of micronutrient adequacy, poverty reduction, and biodiversity conservation (1). Nutrition interventions in developing countries can be described as piecemeal, fragmented, and single-nutrient oriented. Despite the wide availability of edible plant species as a food source, humans have an overdependence on too few species that many food plants have been forgotten or neglected, while lesser known plant species require more research to find out about their potential which contribute macro- and micronutrients needs of the diets in some populations (2). Nonetheless, a significant number of these neglected food plants are still important for meeting the macro- and micronutrient needs of developing country populations in particular (3). Many factors have contributed to the move from diversified to simplified diets such as high-input agriculture, reduced transportation costs, and agricultural subsidies have combined to make refined carbohydrates (wheat, rice, and sugar) cheaper in cities of the developing world that there has been a significant decline in the consumption of indigenous foods (4).

Overall, In the developing world, people gravitate to fashionable "modern" foods while abandoning traditional diets that are considered a sign of backwardness and poverty. Ironically, in industrial societies people increasingly look to traditional diets such as those of East Asia and the Mediterranean as embodiments of good nutrition for health (5). Modernizing systems in Asia need to diversify away from conventional staples to focus more on legumes and micronutrient-rich foods. The consequences of the nutrition transition from pulses, fruits, and vegetables to simplified diets devoid of micronutrients and non-nutrient bioactive protective components pose enormous health and development challenges. The cumulative effects of micronutrient malnutrition established early in life limit educational progress, work productivity, and life expectancy (6). At the population level, the ability of people to participate in economic activities is reduced, and this situation is further complicated and worsened by the burden on national health systems of the pandemic of obesity coexisting with malnutrition (7).

Malnutrition is a global challenge with huge social and economic costs, and the biggest risk factor for the global burden of diseases. (8) One in three people are affected, and virtually every country is facing a major public health issue due to malnutrition (9). Many countries are dealing with a "triple burden" of malnutrition such as energy deficiencies (hunger),

micronutrient deficiencies (hidden hunger), and excessive net energy intake and unhealthy diets (overweight/obesity) (10). Despite significant progress of the global food system, 795 million people still are not getting the minimum dietary energy needs. The majority of these people are in Sub-Saharan Africa, in which 1 in 4 people are hungry; and in South Asia, in which 1 in 6 people are hungry. More than 2 billion people are deficient in key vitamins and minerals7 that are necessary for growth, development, and disease prevention (11). Undernutrition reduces global gross domestic product (GDP) by up to USD 2 trillion per year, the size of the total economy of Africa south of the Sahara. Annual GDP losses due to malnutrition average 11% in Asia and Africa—greater than the loss experienced during the 2008–2010 financial crisis (12).

In earlier years, the widespread availability of food calories resulting from increases in cereal productivity was critical for the rapid decline in the number of hungry people, particularly in developing countries. However, today the availability of high-energy cereal staples is implicated in the nutrition transition phenomenon —the emergence of simplified diets, lack of dietary diversity, and attendant health consequences (6, 7). The vast majority of hungry and malnourished people live in developing countries under substandard living conditions and over half a billion of the global population suffer from chronic food insecurity. With the global population expected to reach over 9 billion by 2050, there will be a continuous need to increase food production and buffer stocks to meet the growing demand and efficiently cope with volatilities in food production and prices. It has been projected that global food production will need to increase by 70% in order to meet the average daily caloric requirement of the world's population in 2050 (13).

Malnutrition can be viewed as an outcome of dysfunctional interactions between different systems: the agri-food system, the environmental system, the health system, and, crucially, the system of individual and household decision-making (14). As malnutrition is the final outcome of a combination of determinants, clustered into food, health, and care, it requires responses from a range of sectors: food security, public health, water, sanitation and hygiene, and social protection. Nutrition is not itself a sector, but it is dependent on actions that originate from these sectors if it is to be effectively and sustainably addressed. Agriculture is obviously a key sector and it needs to work in harmony with other sectors to maximize its impacts on nutrition. Improved water, sanitation, and hygiene (WASH) can increase the nutritional benefits of agricultural programs and policies aimed at improving diets by reducing disease and enhancing nutrient absorption (15).

World Declaration and Plan of Action for Nutrition recommended the promotion of dietary diversity and the use of locally available nutrient-rich indigenous and traditional foods as a vital strategy against food insecurity, malnutrition, and disease (16). The joint recommendation from the World Health Organization (WHO) and FAO on diet, nutrition, and the prevention of chronic diseases and the more recent recommendation on increased consumption of fruit and vegetables for health, reaffirm the urgent need for a global change to dietary diversification. For populations in developing countries, this strategy would entail a significant move toward the greater use of local biodiversity, which engenders good nutrition and ensures diverse and balanced diets (17). The International Plant Genetic Resources Institute (IPGRI) proposes a new kind of intervention—a mobilization of indigenous and traditional food resources to ensure food security and improved health in the developing world. This strategy contrasts with the single-nutrient interventions that have characterized global food and nutrition intervention programs (5). In spite of ample evidence for the positive nutritional and health impacts of dietary diversification, there has been some degree of resistance to large-scale implementation of such types of programs. Nevertheless, dietary diversification offers the best option for long-term sustainability of food resources in communities. This is especially true when traditional knowledge and sociocultural values are nurtured and a community embraces the targeted behavioral changes (18).

Since the time of colonization, there has been a drastic decline in health and integrity of indigenous cultures, social structures and knowledge systems which are integral to our ability to respond to our own needs for adequate amounts of healthy indigenous foods (19). The changing food systems brought about by the forces of globalization have led to both challenges and opportunities. There is alarm that local culture and food traditions are disappearing, where multinational and transnational corporations are increasingly controlling national food in addition, for most countries, micronutrient deficiencies are of concern (20). There are many kinds of local food plants which have their own characteristics contributing enormous health benefits in every region.

Food diversification is compulsory to optimize the daily nutritional requirements. Many kinds of local/ indigenous foods are naturally abundant in carbohydrate and protein contents that can be used as staple foods. They are also rich in functional substances like antioxidants, dietary fibers, vitamins and minerals (21). Promoting biodiverse food is considered a key element in combating micronutrient deficiencies through the household production and

consumption of appropriate foods (19). Local foods such as pumpkin, potatoes, sweet potatoes and cassava can be used as alternatives to rice as a main source of carbohydrates. They contain more micronutrients such as vitamins and minerals. Food diversification can increase eating habits of balanced nutrition food with the application of simple and acceptable food process to attain high quality, nutritious diets. By promoting the beneficial effects of food diversification, people are expected to become more motivated to choose various kinds of carbohydrate more than rice. Moreover, the consumption of a variety of local foodstuffs will help to ensure an adequate food supply at affordable price. Therefore, it is important to encourage the communities to strengthen their use of local food and sustain knowledge of their local food systems for essential contributions to cultural protection, well–being and health. Nutrition–sensitive agricultural programs can reduce poverty and malnutrition among smallholder farmers in their roles as both producers and consumers and help them to optimize their contribution to agricultural production and to food systems as a whole.

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Nutrition Education Module 1: Community Nutrition Screening

Nutrition screening is a rapid process performed to identify a population or an individual who is malnourished or who is at risk for malnutrition to determine if any intervention is required. It allows for prevention of nutrition-related problems when risks are identified and early intervention when problems are confirmed. Early detection and treatment are not only cost-effective but result in improved health and quality of life of the patients (22, 23).

Materials needed:

- White board
- Markers
- Pictures
- Papers
- Pencils
- Weighing machine
- Flexible ruler
- Stadiometer

Objective

- To obtain information about the prevalence of nutritional disorders within a community or a specified population group
- To identify individuals or population groups who are malnourished or at risk of malnutrition
- To involve and assist communities to evaluate overall nutritional status of all ages
- To create awareness of the extent of nutritional status of the individuals in a particular community

Time required: 4-5 hours depend on the number of attendants

Methods:

- Lecture session in which the facilitator is delivering the information of nutritional screening, importance of measuring BMI as a basic assessment to determine the risk of malnutrition in the particular community, how to measure BMI
- Practical session which includes peer teaching activities, reciprocal questioning and group discussions

Program outlines

What is malnutrition?

Malnutrition results from alterations in dietary intake, digestion absorption, metabolism, or excretion of metabolic requirements for dietary energy, protein, and other nutrients. A definition of malnutrition can encompass states of

- Undernutrition (intake of insufficient nutrients to meet requirements)
- Overnutrition (intake of nutrients in excess of requirements)
- Nutrient insufficiency, and
- Nutrient imbalances (24).

Why anthropometric measurements are useful for populations/ groups?

- Any deviation from usual can often be detected earlier by anthropometry than by clinical, biochemical or dietary assessments.
- Anthropometric figures are more objective than other clinical assessments.
- Provides a simple and practical way of describing the overall nutritional status of the population groups (25, 26, 27).

Various types of anthropometric measurements (28)

1) Body mass index (BMI)
2) Head circumference measurement
3) Arm circumference measurement
4) Waist to Hip ratio measurement
5) Skinfold thickness
6) Demi-span
7) Weight for Height
8) Weight for Age
9) Height for Age

Why using BMI for adults?

- Mostly commonly accepted as a 'gold standard' indicator of malnutrition due to the appropriateness for large scale population measurements.
- Convenient to use in many situations without requiring expensive equipment, invasive procedures or a clinical setting to get a general idea of nutritional risks.
- Body weight and stature can be least biased, easily calculated and safe.
- One of the cheapest screening methods to access population weight problems that can have adverse effects on the physical health of the individuals.

How to measure BMI?

- BMI can be measured by using the **weighing machines and flexible ruler or stadiometer**.
- Before measuring body weight, it is important to check for zero-balance before each measurement.
- The subject should stand in the center of the platform, standing relaxed but still and look straight ahead position and measured when the subject is barefooted.
- The body weight should be recorded to the nearest 0.1 kg while the subject is wearing minimal clothing.
- The day-to-day variations should also be noted in measuring body weight and it can be up to ± 1.0 kg (29).
- Use a tape measure that's taped to a hard, straight wall, with the base at floor level when recording the height.
- Heights are measured in standing position with bare feet, stand with feet together and back to the wall so that head, back, buttocks, calves and heels are all touching the wall.
- Recorded the height by placing a flat ruler parallel to the top of head and noting the height to the nearest 0.5 centimeters.
- Calculate the BMI by using height and weight value according to the BMI formula and compare with the reference to see the nutritional status

Classification of weight status by BMI (30)

Classification	BMI (kg/m^2)
Underweight	<18.5
Normal weight	18.5–24.9
Overweight	25–29.9
Obesity Class 1	30–34.9
Obesity Class 2	35–39.9
Extreme Obesity Class 3	>40

BMI calculation sample sheet for practice

Body Mass Index (BMI) is defined as body weight in kilograms divided by height in meters squared.

$$\text{BMI} = \frac{mass\ (kg)}{height\ x\ height\ (m)}$$

Name	
Age	
Mass (kg/lb)	
Height (m/ft)	
BMI	
Category	

What measurement is used for children and teens (5–19 years)?

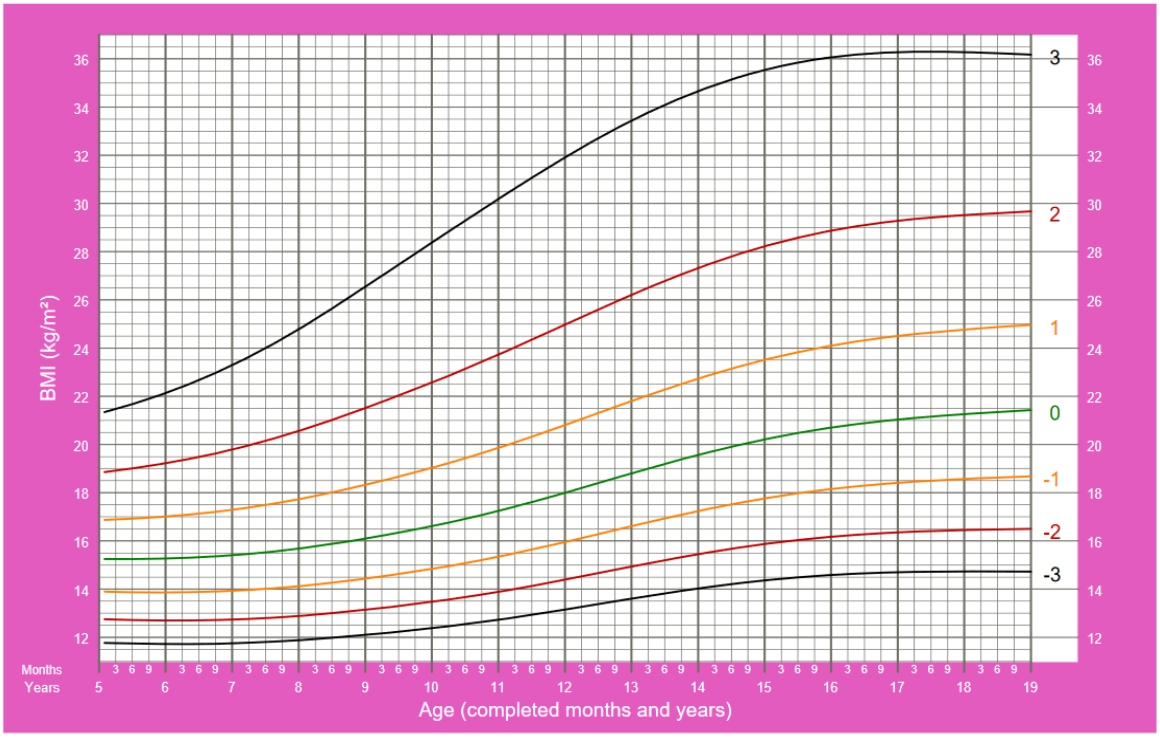
In children and teens, BMI is age- and sex-specific and is often referred to as BMI-for-age.

- Measure the weight and height according to the same procedure as adults
- Calculate BMI and plot the value on BMI-for-age percentile growth charts
- Using the gender-correct growth chart titled BMI-for-age, find the age of the participant on the horizontal axis and the BMI on the vertical axis.
- The point of intersection is the BMI-for-age percentile.
- Interpret the BMI-for-Age Percentile Score using the reference table.
- An accurate interpretation of growth depends on the accuracy of weighing and measuring.

BMI-for-age GIRLS

5 to 19 years (z-scores)

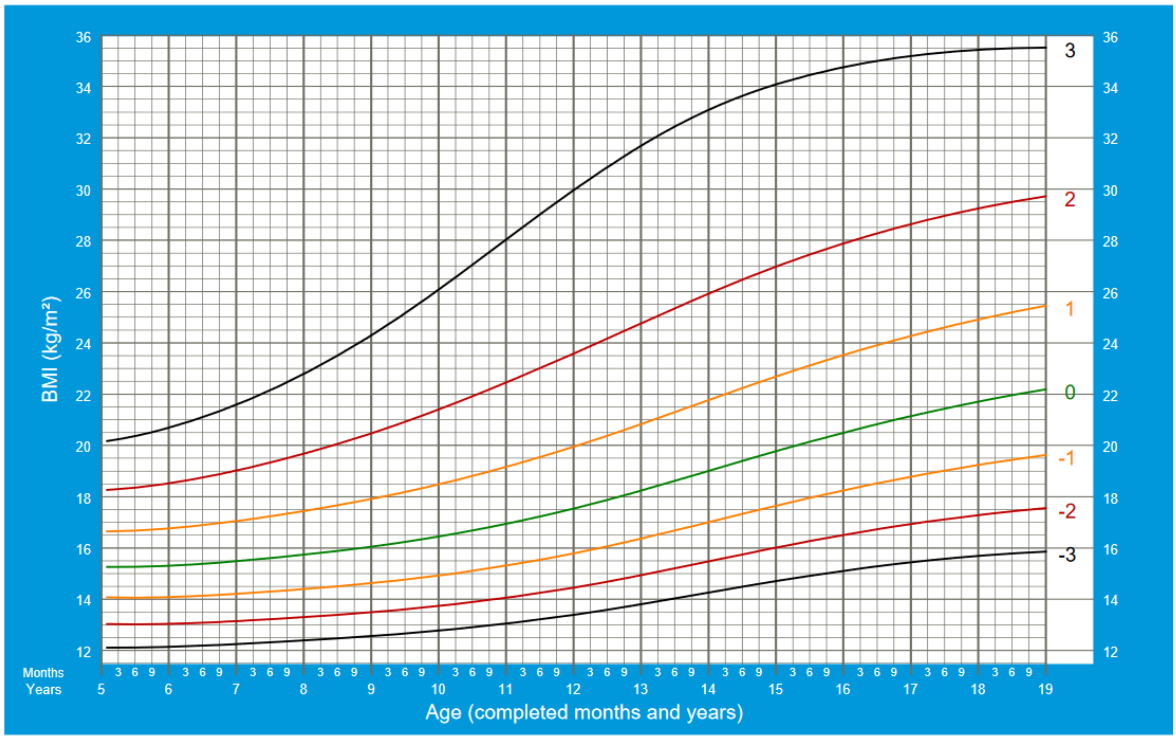
World Health Organization



BMI-for-age BOYS

5 to 19 years (z-scores)

World Health Organization



What measurement is used for boys and girls aged 0 to 60 months?

The most commonly used anthropometric indices for aged 0 to 60 months old are

1) Weight–for–height Z–scores (WHZ),
2) Height–for–age Z–scores (HAZ) and
3) Weight–for–age Z–scores (WAZ)

The weight and height results are compared to World Health Organization (WHO) standardized age– and sex–specific growth reference. The interpretations of these indicators reflect general health status, diet adequacy, growth and development of children.

The WHO Child Growth Standards depict normal growth under optimal environmental conditions and can be used to assess children everywhere, regardless of ethnicity, socio–economic status and type of feeding.

- Weight–for–height is an index used for assessing wasting (acute malnutrition).
- Height–for age is an index used for assessing stunting (chronic malnutrition).
- Weight–for–age is an index used in growth monitoring for assessing underweight.

What is wasting?

Wasting is defined as a low weight for the height of the child compared to the standard child of the same height. Wasted children are vulnerable to infection and stand a greater chance of dying.

What is stunting?

Stunting is defined as a low height for age of the child compared to the standard child of the same age. Stunted children have poor physical and intellectual performance and lower work output leading to lower productivity at individual level and poor socioeconomic development at the community level. Stunting of children in a given population indicates the fact that the children have suffered from chronic malnutrition so that it has affected their linear growth.

How to measure weight and heights of infants and toddlers?

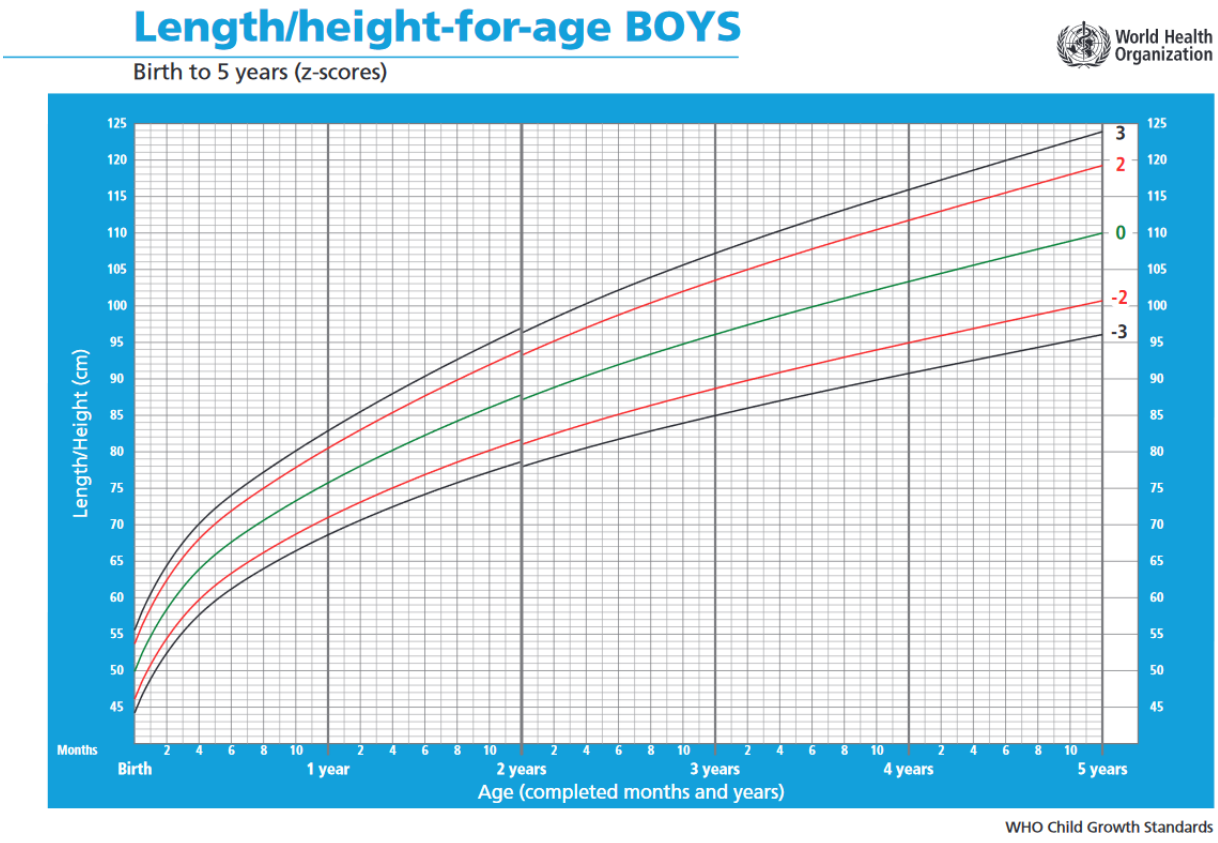
- When it is not possible to weigh the child by himself/herself, the weight of the child is obtained by subtracting the weight of the mother from the combined weight of the mother and child.

- Recumbent length is used for measuring heights in infants and children less than two years of age.
- It can also be used for children two to three years of age who have great difficulty standing on their own; these children must be measured lying down and the measurement should be recorded as recumbent length.

Expected outcomes

At the end of the session, the participants are expected to

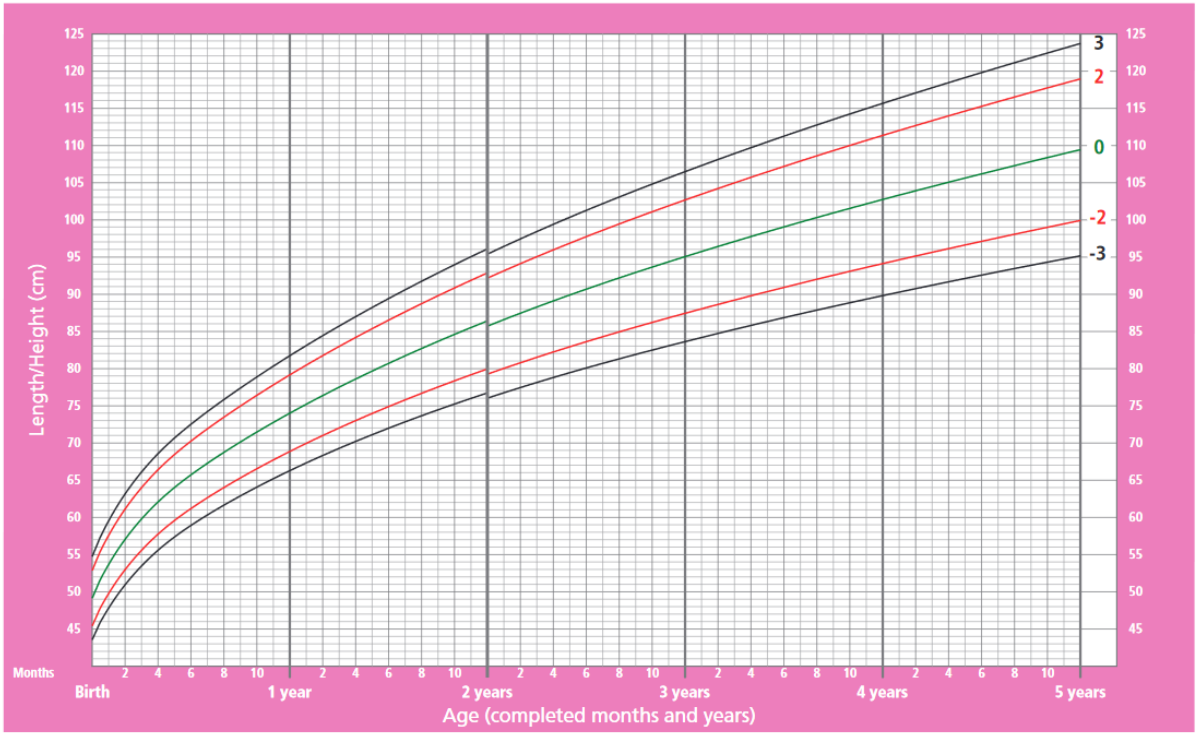
- Understand the important of nutrition screening
- Be able to perform their self–assessments or for their family members
- Identify undetected malnutrition risks if they have any
- Modify life style to eat more nutritionally and healthily
- Regularly monitor and assess current nutritional status



Length/height-for-age GIRLS

Birth to 5 years (z-scores)

World Health Organization

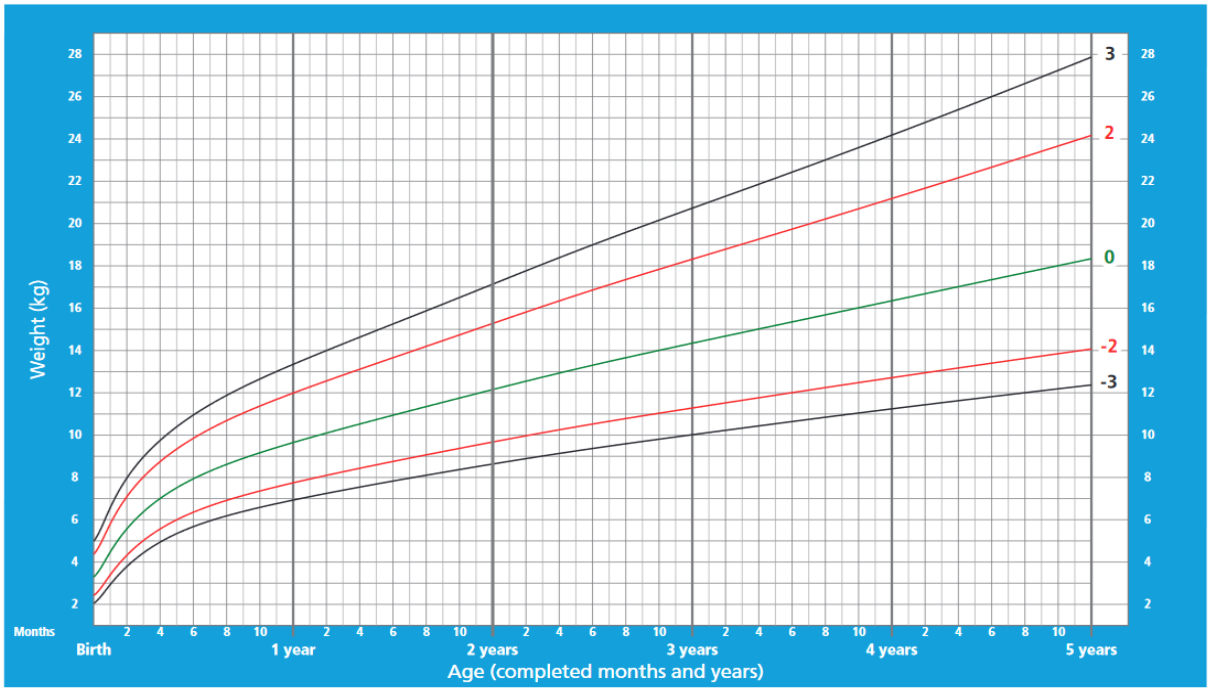


WHO Child Growth Standards

Weight-for-age BOYS

Birth to 5 years (z-scores)

World Health Organization

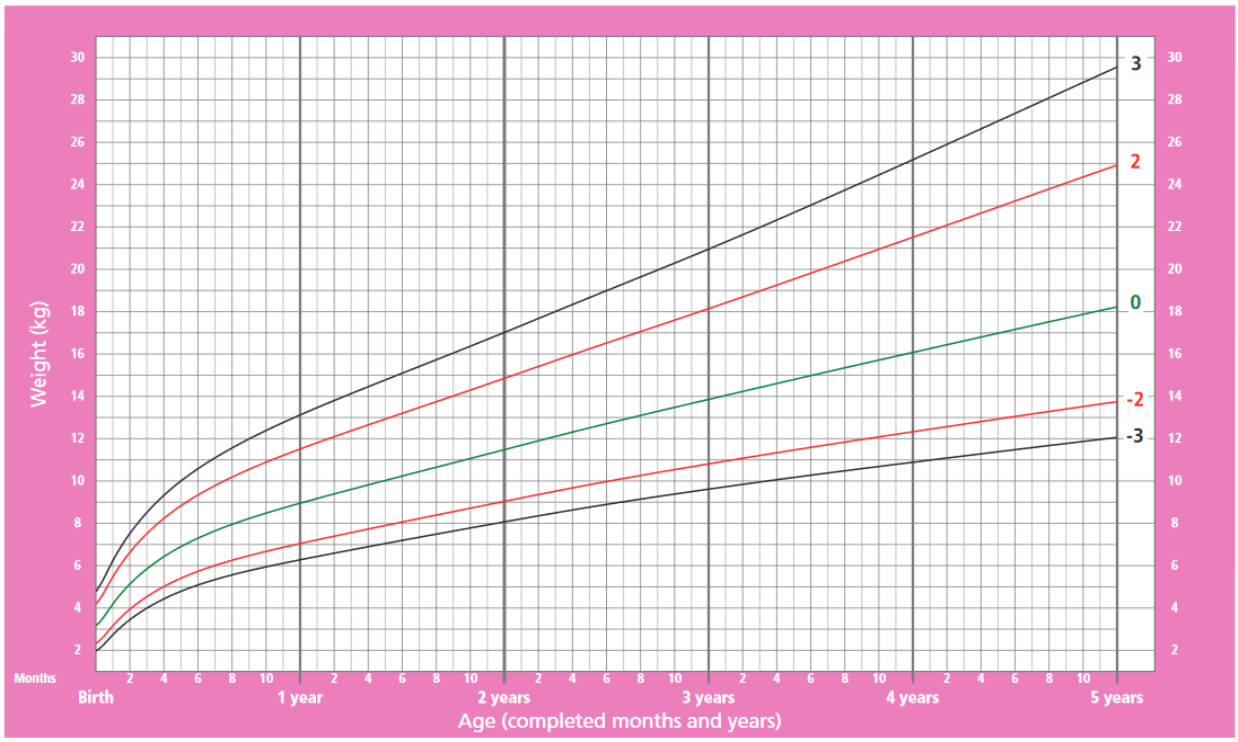


WHO Child Growth Standards

Weight-for-age GIRLS

Birth to 5 years (z-scores)

World Health Organization

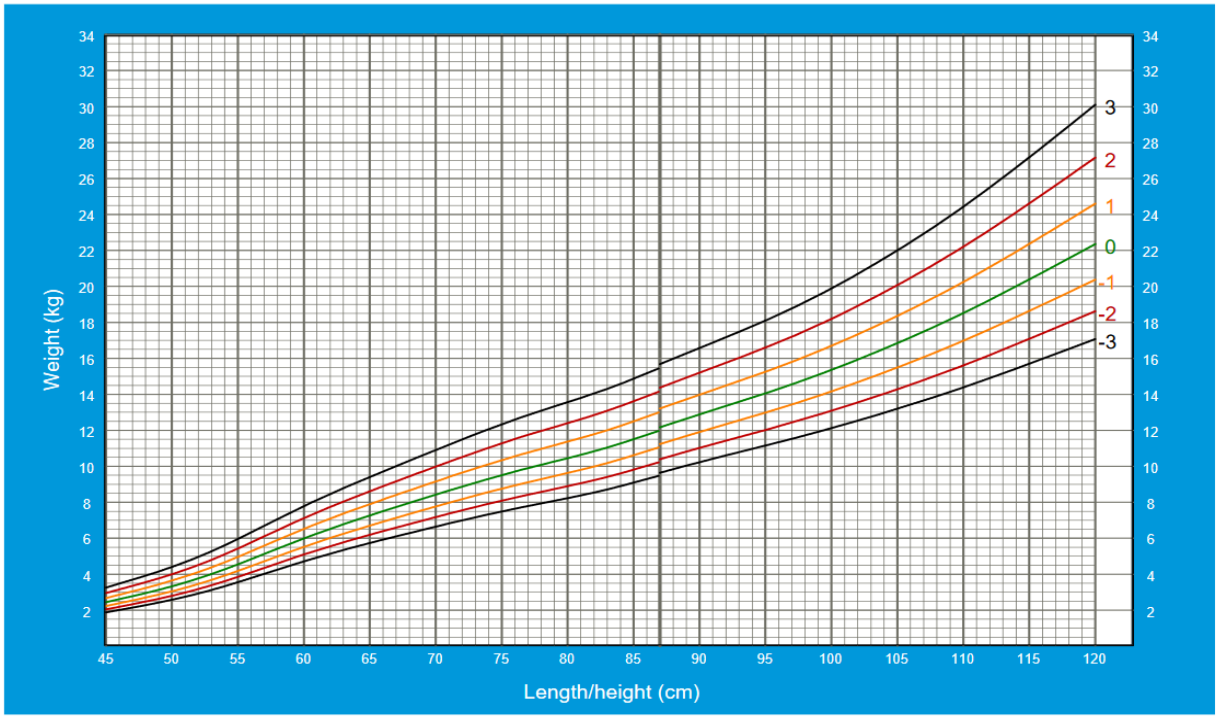


WHO Child Growth Standards

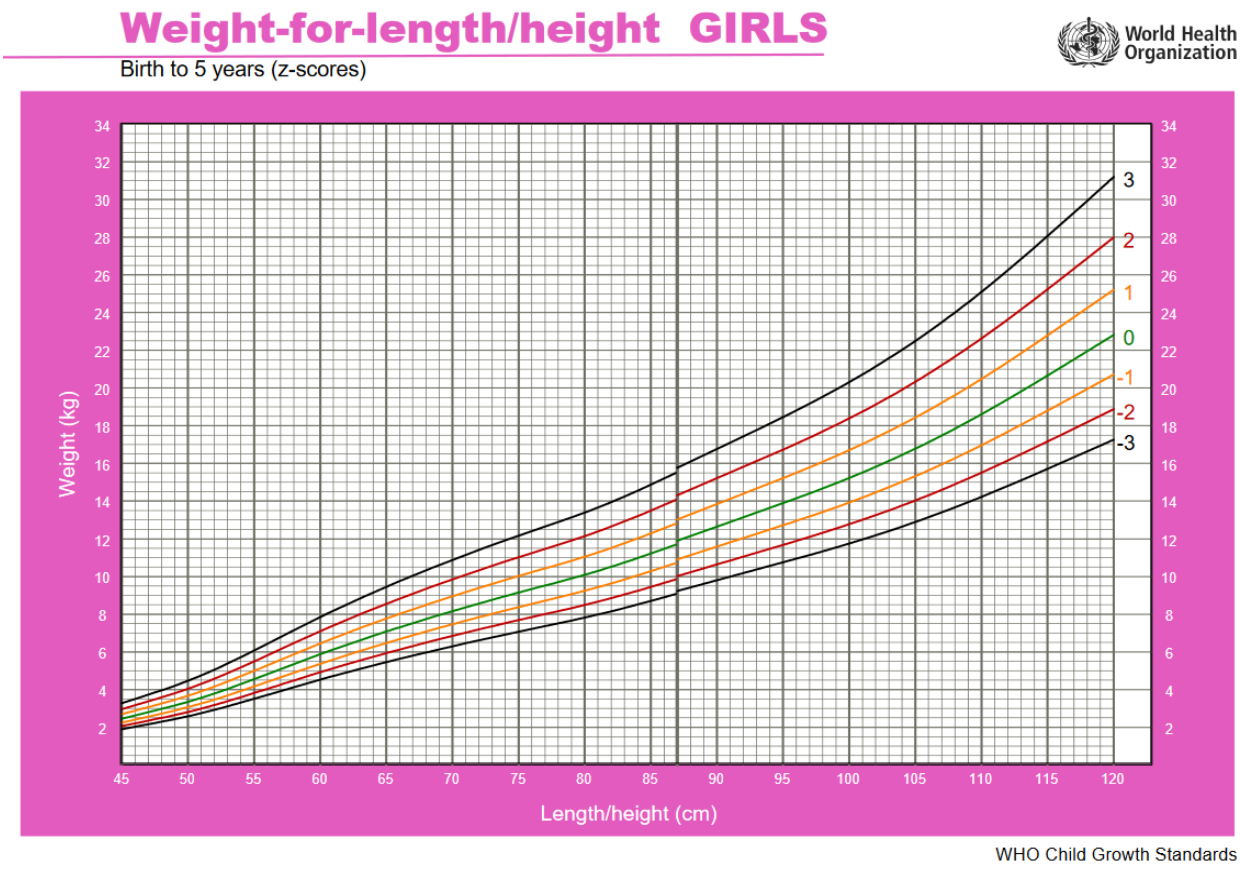
Weight-for-length/height BOYS

Birth to 5 years (z-scores)

World Health Organization

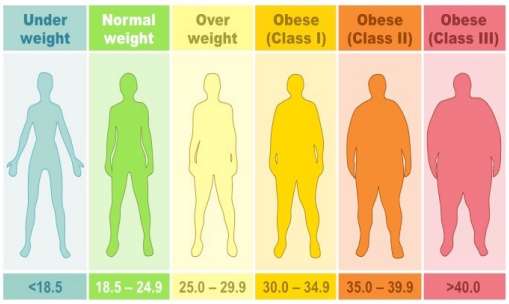


WHO Child Growth Standards



Practical session procedures

- The facilitator will be demonstrating how to measure weight and height in front of the participants and let each participant engage in the activity
- The facilitator will be teaching the participants how to calculate BMI for adults and how to read the growth standards for children (0–5 years)
- The measurements will be compared to the standards/ reference data in order to evaluate their nutritional status
- After that, the participants will be asked to find the partners to measure each other's height and weight to find out BMI or to measure the children's height and weight and compare with the growth standards
- If the participant has difficulty performing mathematical tasks, they can use a BMI Chart after measuring weight and height
- Let them classify the nutritional status of the partners



WEIGHT	lbs	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290
	kgs	41	45	50	54	59	64	68	73	77	82	86	91	95	100	104	109	113	118	122	127	132
HEIGHT			Underweight					Healthy				Overweight				Obese				Extremely Obese		
ft/in	cm																					
4'8"	142.2	20	22	25	27	29	31	34	36	38	40	43	45	47	49	52	54	56	58	61	63	65
4'9"	144.7	19	22	24	26	28	30	32	35	37	39	41	43	45	48	50	52	54	56	58	61	63
4'10"	147.3	19	21	23	25	27	29	31	33	36	38	40	42	44	46	48	50	52	54	56	59	61
4'11"	149.8	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	51	53	55	57	59
4'12"	152.4	18	20	21	23	25	27	29	31	33	35	37	39	41	43	45	47	49	51	53	55	57
5'1"	154.9	17	19	21	23	25	26	28	30	32	34	36	38	40	42	43	45	47	49	51	53	55
5'2"	157.4	16	18	20	22	24	26	27	29	31	33	35	37	38	40	42	44	46	48	49	51	53
5'3"	160.0	16	18	19	21	23	25	27	28	30	32	34	35	37	39	41	43	44	46	48	50	51
5'4"	162.5	15	17	19	21	22	24	26	27	29	31	33	34	36	38	39	41	43	45	46	48	50
5'5"	165.1	15	17	18	20	22	23	25	27	28	30	32	33	35	37	38	40	42	43	45	47	48
5'6"	167.6	15	16	18	19	21	23	24	26	27	29	31	32	34	36	37	39	40	42	44	45	47
5'7"	170.1	14	16	17	19	20	22	24	25	27	28	30	31	33	34	36	38	39	41	42	44	45
5'8"	172.7	14	15	17	18	20	21	23	24	26	27	29	30	32	33	35	37	38	40	41	43	44
5'9"	175.2	13	15	16	18	19	21	22	24	25	27	28	30	31	33	34	35	37	38	40	41	43
5'10"	177.8	13	14	16	17	19	20	22	23	24	26	27	29	30	32	33	34	36	37	39	40	42
5'11"	180.3	13	14	15	17	18	20	21	22	24	25	27	28	29	31	32	33	35	36	38	39	40
5'12"	182.8	12	14	15	16	18	19	20	22	23	24	26	27	28	30	31	33	34	35	37	38	39
6'1"	185.4	12	13	15	16	17	18	20	21	22	24	25	26	28	29	30	32	33	34	36	37	38
6'2"	187.9	12	13	14	15	17	18	19	21	22	23	24	26	27	28	30	31	32	33	35	36	37
6'3"	190.5	11	13	14	15	16	18	19	20	21	23	24	25	26	28	29	30	31	33	34	35	36
6'4"	193.0	11	12	13	15	16	17	18	19	21	22	23	24	26	27	28	29	30	32	33	34	35
6'5"	195.5	11	12	13	14	15	17	18	19	20	21	23	24	25	26	27	28	30	31	32	33	34
6'6"	198.1	10	12	13	14	15	16	17	18	20	21	22	23	24	25	27	28	29	30	31	32	34
6'7"	200.6	10	11	12	14	15	16	17	18	19	20	21	23	24	25	26	27	28	29	30	32	33
6'8"	203.2	10	11	12	13	14	15	16	18	19	20	21	22	23	24	25	26	27	29	30	31	32
6'9"	205.7	10	11	12	13	14	15	16	17	18	19	20	21	23	24	25	26	27	28	29	30	31
6'10"	208.2	9	10	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
6'11"	210.8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	25	26	27	28	29	30

Nutrition Education Module 2: Agriculture and Nutrition

Materials needed

- White board
- Markers
- Handouts
- Pictures
- A model kitchen garden

Methods

- Passive learning process followed by interactive discussions at the end of the lecture

Objective

Community-based nutrition education intervention program focused on the relation of agriculture and nutrition

- To improve household food security and dietary diversity
- To demonstrate the pathways between agriculture (as a livelihood) and nutrition-relevant outcomes especially how women are significantly engaged
- To promote the diversity of production as well as consumption by strengthening farmers' knowledge to consume the foods being produced that are important for nutrition
- To ensure that community-based agricultural projects or home gardens are based on the food needs and nutritional requirements of the community
- To choose appropriate processing and storage of fruits and vegetables which are important to minimize nutrient losses
- To reduce waste and post-harvest losses, extend seasonal availability and generate employment
- To ensure that increased food supply translates into improved dietary quality and ultimately improved nutritional status of the community

Time required: 3 hours

Procedures

This program is mainly composed of lecture session in which the facilitator provides information on how the agriculture is linked to nutrition, role of home gardening, food security and food diversity by using educational aids such as white board, markers, pictures, handouts and a model kitchen garden.

Teaching session outlines (19, 31, 32, 33, 34, 35, 36, 37, 38, 39)

- Agriculture continues to be the primary source of livelihood for the majority of nutritionally vulnerable households in Myanmar.
- In addition to providing food and raw material, agriculture also provides employment opportunities to very large percentage of the global population.
- Agriculture and food systems play a central role in nutrition by supplying nutritious, healthy and affordable foods and simple nutrition messages around specific crops can be effective if they are targeted to the farmers who grow the crops.
- Agriculture mainly affects nutrition through the production (and therefore improved availability) of food, not only staple crops but also animal source of foods, fruits, and vegetables. Soil quality, agricultural practices, and technologies such as biofortification, as well as dietary practices, were said to further influence this pathway.
- The increase in food production, particularly that of staple grains, pulses and vegetables, showed more conclusive evidence on improving the nutrient intake and nutritional outcomes, compared with the overall agricultural growth rates.
- Agriculture sector has close links to both the immediate causes of undernutrition (diets, feeding practices, and health) and its underlying determinants (such as income, food security, education, access to water, sanitation and hygiene (WASH) and health services, and gender equity) and therefore it can play a much stronger role than in the past in improving nutrition outcomes.
- Agricultural biodiversity is important for food and nutritional security. It also acts as a safeguard against hunger, a source of nutrients for improved dietary diversity and quality and strengthening local food systems and environmental sustainability.
- Intake of one variety rather than another can be the difference between micronutrient deficiency and micronutrient adequacy in traditional farming. Adequate human nutrition thus involves regular intake of a wide range of nutrients, some of which must be consumed on a frequent basis, even if in small quantities. It is important to focus on diversification of diets rather than a reliance on fortified foods and supplementation where possible.
- Traditional varieties of different crops not only have different genetic attributes than modern varieties; they also have several consumption characteristics such as taste, aroma, cooking quality, nutrition, etc. Therefore, the farmer households should be encouraged to consume more diverse plant resources including wild-harvested foods as well as traditional crops because they contain variety of macro and micronutrients.
- Cultivation of home gardens and ownership of domesticated animals are also potential ways of increasing household access to nutritious foods and home gardens have been shown to provide a number of economic and dietary advantages in rural and urban areas in predominantly small-scale subsistence agricultural systems.

- Globally, home gardens have been documented as an important supplemental source contributing to food and nutritional security and livelihoods. Home gardens are classified as mixed, kitchen, backyard, farmyard, compound or homestead garden. Home gardens can be described as a mixed cropping system that encompasses vegetables, fruits, plantation crops, spices, herbs, ornamental and medicinal plants as well as livestock that can serve as a supplementary source of food and income.
- A dietary diversification approach based on mixed home gardening allows beneficiaries to participate directly in improving their nutrition and health status by using traditionally accepted agricultural practices.
- Studies demonstrated that household agricultural production can directly influence household dietary patterns and the nutritional status of household members, but the extent of impact depends on a variety of factors including location, commodities, and the role of livestock.
- The key benefits of home gardening are improved food security, increased availability of food and better nutrition through food diversity, enhanced income and rural employment through additional or off–season production, decreased malnutrition risks through diversification and offer environmental benefits from recycling water and waste nutrients, controlling shade, dust and erosion, and maintaining or increasing local biodiversity.
- Agricultural programs can strengthen impact on nutrition if they maintain or improve the natural resource base (water, soil, air, climate, biodiversity), critical to the livelihoods and resilience of vulnerable farmers and to sustainable food and nutrition security for all and manage water resources in particular to reduce vector–borne illness and to ensure sustainable, safe household.
- Agricultural programs can empower women by ensuring access to productive resources, income opportunities, active participation in food productions such as home gardening and supporting their voice in household and farming decisions. However, equitable opportunities to earn and learn should be compatible with safe pregnancy and young child feeding.
- Agricultural technologies and production systems can increase the diversity and nutritional value of production by improving processing, storage and preservation of foods to retain nutritional value, shelf–life, and food safety, reducing seasonality of food insecurity and post–harvest losses to make healthy foods convenient to prepare, and improving faming technologies such as drip irrigation, water management, composting, animal integration.
- Use of local readily available materials, for example, use of forest litter, animal waste, farm–yard manure, etc., and avoidance of synthetic fertilizers, except in river valleys

where modern agricultural practices are followed, ensure that safe organic foods are produced for human consumption.

- Overall, agricultural development programs that promote production diversity, biofortified crops, dairy, or small animal rearing can improve the production and consumption of targeted commodities, and some evidence that such improvements lead to increases in dietary diversity at the household and sometimes the maternal and child level.

Six pathways linking agriculture and nutrition are as follows:

- ✓ Pathway 1: Agriculture as a source of food for household consumption: the most direct pathway by which household agricultural production translates into consumption (via crops cultivated by the household).
- ✓ Pathway 2: Agriculture as a source of income for food and nonfood expenditures as agriculture generates income (via wages earned or through sale of food produced), which is translated into expenditure on nutrition–enhancing goods and services (including health, education, and social services). The income spent on nutritious food may have impact on malnutrition.
- ✓ Pathway 3: Effects of agriculture policy and food prices on food consumption: Agricultural policies can affect the relative prices and affordability of various marketed food and non–food crops.
- ✓ Pathway 4: Effects of women's employment in agriculture on intrahousehold decision making and resource allocation: agricultural labor conditions can influence the empowerment of women and thus their control over nutrition–relevant resources and decision making, particularly regarding food and healthcare.
- ✓ Pathway 5: Effects of women's employment in agriculture on childcare and child feeding: The involvement of mothers in agriculture may influence their ability to manage child care and feeding.
- ✓ Pathway 6: Effects of women's employment in agriculture on their own nutritional and health status: The maternal nutritional outcomes and health may be compromised due to involvement in agriculture. The work–related energy expenditure may exceed the intake, or the dietary diversity may be compromised. Some of the agricultural practices may be hazardous to their health. These factors, consequently, affect the nutritional status of the children.

What is food security?

A situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (40).

What is dietary diversity?

Dietary diversity is a qualitative measure of food consumption that reflects household access to a variety of foods, and is also a proxy for nutrient adequacy of the diet of individuals (41).

What is home gardening?

The household garden is a small-scale production system supplying plant and animal consumption and utilitarian items either not obtainable, affordable, or readily available through retail markets, field cultivation, hunting, gathering, fishing, and wage earning. Household gardens tend to be located close to dwelling for security, convenience, and special care. They occupy land marginal to field production and labor marginal to major household economic activities. Featuring ecologically adapted and complementary species, household gardens are marked by low capital input and simple technology. Generally, home gardening refers to the cultivation of a small portion of land which may be around the household or within walking distance from the family home (42).

What is nutrition-specific interventions or programs?

Nutrition-specific interventions or programs are those that address the immediate determinants of fetal and child nutrition and development—adequate food and nutrient intake, feeding, caregiving and parenting practices, and low burden of infectious diseases (43).

What is nutrition-sensitive interventions or programs?

Nutrition-sensitive interventions or programs are those that address the underlying determinants of fetal and child nutrition and development—food security; adequate caregiving resources at the maternal, household and community levels; and access to health services and a safe and hygienic environment—and incorporate specific nutrition goals and actions (43).

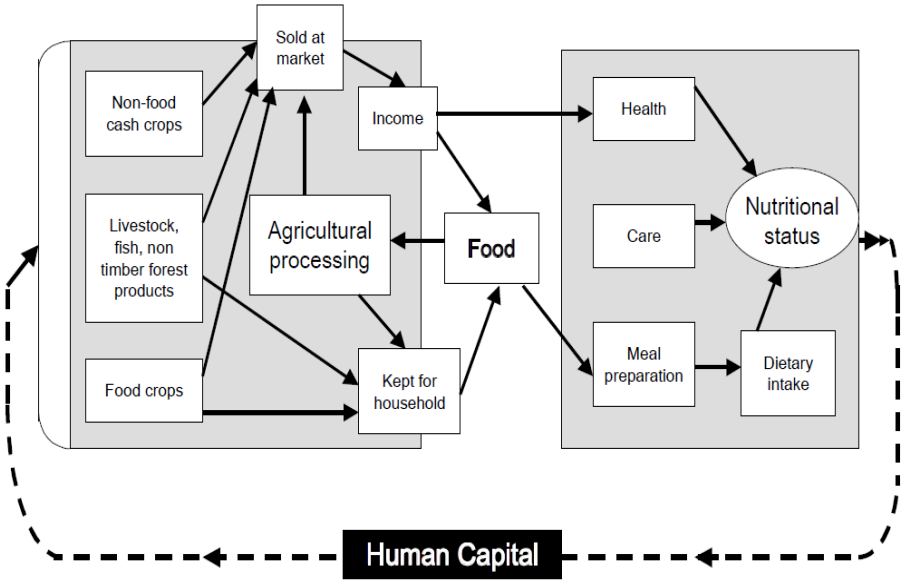
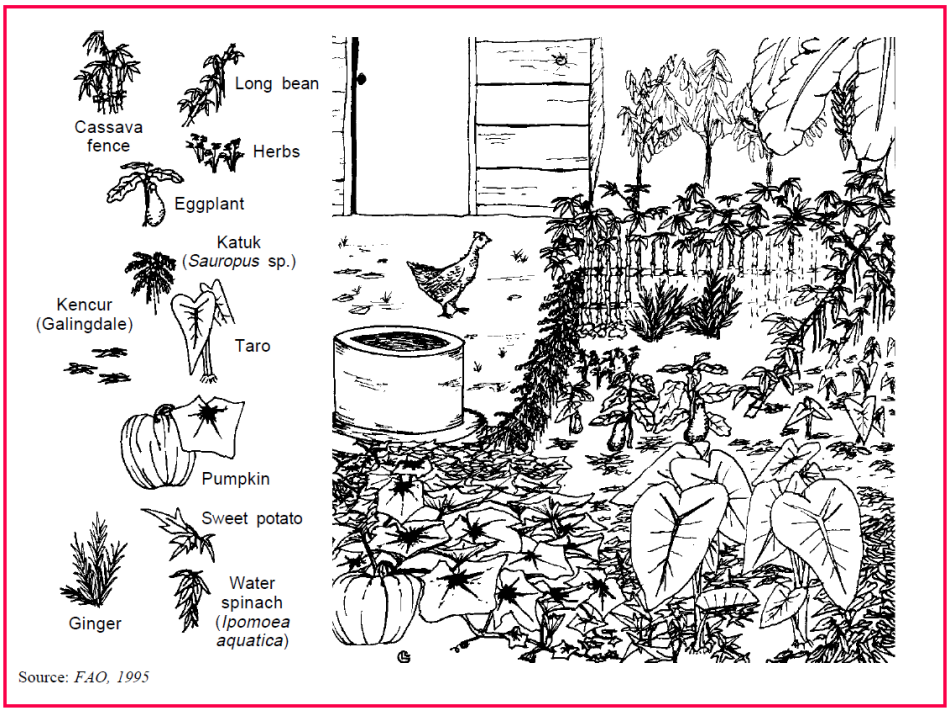


Figure 2
The agriculture-nutrition advantage framework
Source: Johnson-Welch et al. (2005)



1
Typical home garden for food and income

Expected outcomes

The session is mainly intended to

- Reduce food loss
- Promote indigenous/ diversified food productions
- Integrate nutrition knowledge in agriculture
- Increase income earning opportunities and encourage roles of females in agriculture
- Improve food safety
- Increase awareness of overuse of pesticides
- Reduce food wastes
- Expand seasonal availability of food
- Improved dietary quality

Nutrition Education Module 3: Promoting Healthy Eating

Materials needed

- White board
- Markers
- Food model cards
- Pictures
- Educational posters
- Pictorial summary of food groups

Methods

- Active learning process which involves reciprocal questionings
- Two-way discussions
- Group quizzes

Objective

- To be able to make a simple and healthful eating plan for everyday living
- To get an overview of how much of the total consumption should come from each food group to achieve a healthy, balanced diet
- To educate the community about nutrition and healthy dietary practices
- To promote fruit and vegetable consumptions
- To reduce micronutrient deficiencies
- To encourage demand for healthy foods and meals through promoting awareness of a healthy diet
- To increase household access to nutrient-rich foods which impact on household dietary diversity and on the consumption of animal-source foods or fruits and vegetables

Time required

- 3 hours for each session

Procedures

- Lecture session including introduction of healthy and balanced diet, healthy plate, eating patterns and key micronutrients.
- Giving them additional information about healthy nutrition and food choices.
- Explanation of different food groups using photographs of typical Myanmar ingredients/ foods and food model cards.

- Discuss the functions and sources of micronutrients by using pictures of commonly eaten Myanmar foods.
- Using Myanmar educational nutritional posters for better understanding of the participants.
- Active discussion session including interviewing the participants about their habitual dietary pattern, typical cooking methods and how to improve better or how to prevent nutrient losses.
- Questions and answers session choosing random participants by using sample questions described below.
- Quiz session using food model cards or pictures and let the participants identify which food is from which food groups or what micronutrients are in it etc.

Session I: Food groups in your diet

What is a healthful diet?

A healthful diet includes a variety of fruits and vegetables of many colors, grains and starches, good fats, and lean proteins in the right proportions. Eating healthfully also means avoiding foods with high amounts of added salt and sugar and also drink plenty of water to keep hydrated and to help body function better.

Why is it important to have a good nutrition?

Good nutrition is an important part of leading a healthy lifestyle. A healthful diet can help to reach and maintain a healthy weight, reduce and prevent the risk of diseases and infections, improve the immune system and promote general wellbeing and overall health.

How to choose a balanced diet?

A healthy balanced diet is one with plenty of variety, covering all of the five main food groups in suitable proportions. It is important to choose a variety of foods from the 5 different food groups – specifically:

1. Vegetables and fruits
2. Protein (meat, fish, eggs, beans, soy, legumes)
3. Milk and dairy products or other milk alternatives
4. Carbohydrates (such as rice, potatoes, pumpkin, corn, sweet potatoes, taro, legumes and bread – preferably wholegrains or whole wheat varieties)
5. A small quantity of healthy fats

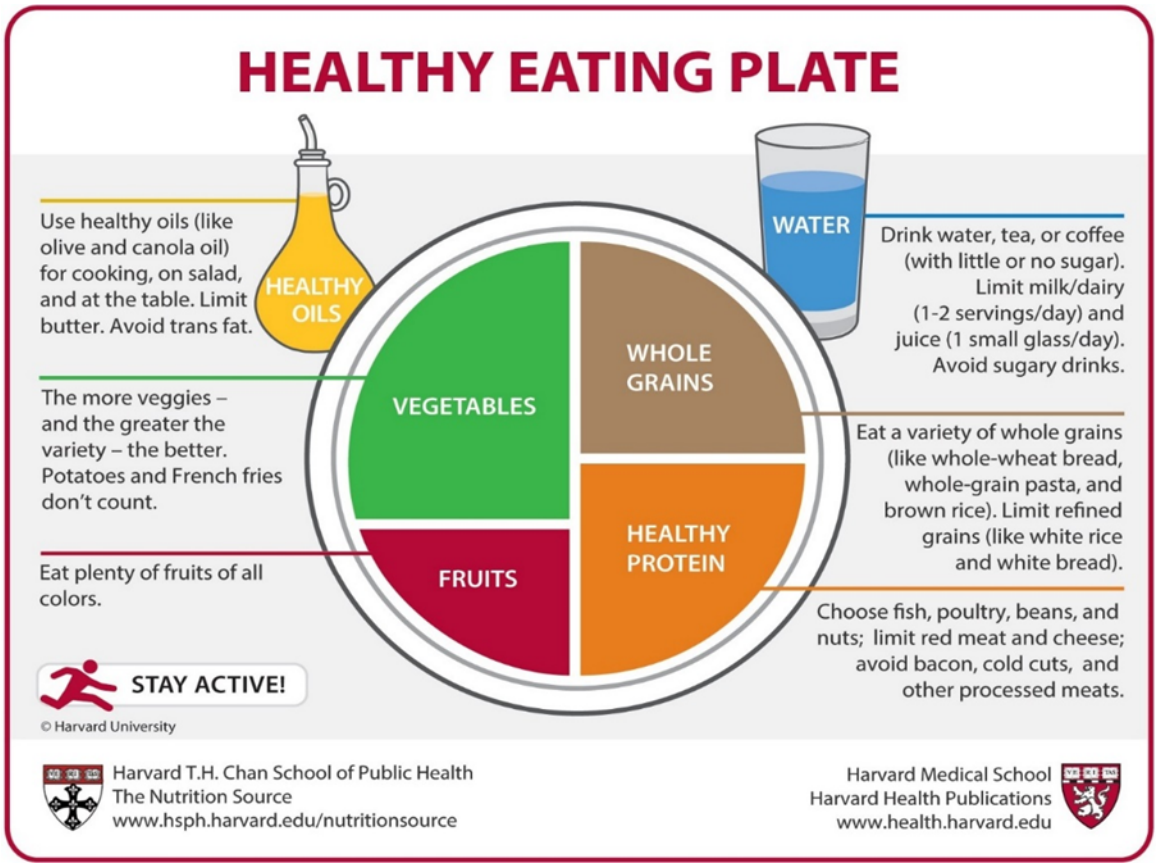
How to prepare a healthy plate?

One of the simplest and easiest food preparations is MyPlate published by the United States Department of Agriculture (USDA) Center for Nutrition Policy and Promotion, which informs consumers to the healthiest choices from the major food groups.

The recommendation is to divide the plate into sections of approximately 30 percent grains, 40 percent vegetables, 10 percent fruits and 20 percent protein, accompanied by a smaller circle representing milk and dairy products, such as a glass of milk or a yogurt cup. If dairy products are not easily assessible in the area, it can be replaced with milk alternatives.

The more detailed version of MyPlate was developed by Harvard School of Public Health called The Healthy Eating Plate which features a higher ratio of vegetables to fruits, adds healthy oils, balances healthy protein and whole grains as equal quarters of the plate, along with recommending water and suggesting sparing dairy consumption.

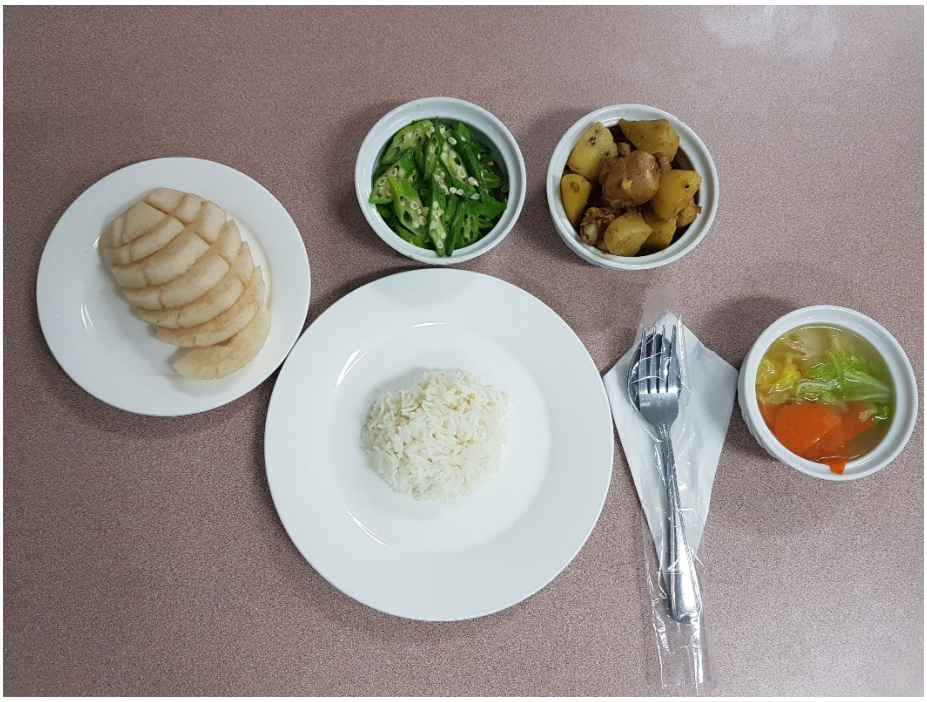
It is not necessary to measure the exact quantities of the foods per serving as long as the proper portions are eaten on a daily basic (28, 44).



Functions of macronutrients from 5 food groups and their sources

Contents	Functions	Sources
Carbohydrate (grains)	1) Main source of energy 2) Regulation of blood glucose 3) Degradation of skeletal muscle and other tissues such as the heart, liver, and kidneys 4) Gut health	Foods rich in carbohydrate are rice, maize, wheat, millet, oats, rye, barley, and other cereals, all types of starchy root crops such as potatoes, corn, sweet potatoes, pumpkin, yams and cassava, legumes such as peas and beans, most vegetables, fruits and sugars and oilseeds.
Fats and oils	1) Provide energy 2) Fat soluble vitamins absorption 3) Brain development and health 4) Insulation and Temperature Regulation 5) Protection of internal organs	Good sources Unsaturated fats: peanut oil, corn oil, soybean oil, sunflower oil, sesame oil, olive oil, avocado, fish, nuts and seeds Bad sources Saturated fats: coconut oil, palm oil, cream, butter, animal fats Trans fats: margarine, fried foods and baked goods made with shortenings or partially hydrogenated vegetable oils
Protein	1) Growth and development 2) Provides amino acids for basic body functions 3) Bolsters Immune Health 4) Major component of the body's transportation system that carries oxygen and nutrients to all cells of the body 5) Help in building and repair of muscles, tissues and bones	Animal sources: all types of meat, poultry, fish, eggs and dairy Plant sources: beans, peas, lentils and other legumes, nuts and soy products

Fruits and vegetables	1) Protection against diseases 2) Weight control 3) Gut health 4) Overall health benefits	All fresh, dried and frozen fruits and vegetables including starchy vegetables and legumes
Milk and dairy products	1) Contributes essential nutrients 2) Benefits overall bone health 3) As part of a healthy balanced diet	Milk products such as milk, yoghurt, ice cream and cheese



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Additional information guide for healthy nutrition

Eat foods from 5 food groups everyday:

1. Vegetables & fruits

- Increase the amount and variety of fruits and vegetables consumed.
- Include vegetables and/or fruits at every meal.
- Make fruits as nutritious desserts most days instead of oily snacks and sugary drinks.

2. Grains

- Choose high fiber whole grain cereal, bread, rice and noodles.
- Reduce intake of refined sources of carbohydrates which are high in sugars.

3. Milk and milk alternatives

- Choose milk or milk alternatives often (such as rice milk, yogurt or soy beverage).

4. Meat and alternatives

- Select lean meat and meat alternatives prepared with little or no added fat or salt.
- Trim all visible fat from meat.
- Remove poultry skin before eating.
- Eat alternatives to red meat such as fish, tofu & legumes (dried beans, peas & lentils) several times per week.
- Eat fish at least twice per week.
- Limit or avoid deep-fried, battered meat, fish and poultry.
- Limit egg yolks to no more than 2 yolks per week, including egg yolks in baked goods.

5. Fats and oils

- Choose a variety of oils (peanut, corn, soybean) and foods containing natural fats (nuts, seeds, avocado, olives, soy, fish).
- Limit saturated fat from animal products. The exceptions are palm and coconut oils. These fats come from plants but are high in saturated fat.

Other nutrition tips

1) Choose foods prepared with little or no salt.
2) Avoid added salt at the table and cooking and salty foods.
3) Use seasonings such as spices, fresh herbs, onion, lemon and vinegars for added flavor.
4) Avoid foods with which are high in monosodium glutamate (MSG).
5) Limit use of condiments such as soy sauce, chili powder, fish sauce, etc.

6) Eat less sugar and other sweets.
7) Avoid fried fast food and processed foods containing vegetable shortening and sodium.
8) Limit or avoid alcohol.
9) Limit high calorie food with little nutritional value such as soft drinks, cakes, pastries, biscuits, and deep-fried foods.

Questions and answers session

1. Identify the foods based on food groups using food models, pictures or flashcards.
2. What are the sources of starch/ protein/ fats/ fruits/ vegetables and dairy products?
3. What starch/ protein/ fats/ fruits/ vegetables and dairy foods do you eat?
4. Think about how much of the total food you eat comes from starchy foods.
5. Do you think you get enough starch/ protein/ fats/ fruits/ vegetables and dairy foods?
6. What sugars and sugary foods or beverages do you eat or drink?
7. Do you get your protein more from plant foods or from animal foods?
8. How could you add different protein foods to your meals to be sure to meet your protein needs?
9. What foods do you eat that are high in fat?
10. How much of each type of fat do you have in your diet? Do you get more unsaturated, saturated or trans-fat?
11. What changes can you make in your foods and your meals to be sure you eat more healthy fats?

Session II: Local food sources of micronutrients

Introduction

Micronutrients (vitamins and minerals) in foods are necessary for the body to grow, develop and function properly. They are needed in minute but specific amounts and are essential for health and general well–being. Human bodies require a number of different micronutrients, each of which has a specific function in the body and must be supplied in different, sufficient quantities.

During times of rapid growth, such as during pregnancy and lactation, early infant and child growth and during periods of certain illnesses, it is especially important to get enough vitamins and minerals. For normal health to be maintained, a wide range of vitamins, minerals and trace elements must be present in adequate amounts in the body, and the dietary intake must be sufficient enough to meet the requirement (45).

Factors influencing the stability of vitamins and minerals

Many factors influence the stability of vitamins and minerals from the harvesting process, storage to food processing. Cautiousness at every stage is required to preserve the quality of the nutrient. The factors include:

- ✓ Temperature
- ✓ Moisture content
- ✓ Presence or absence of light
- ✓ Presence of oxygen
- ✓ Milling
- ✓ Refining
- ✓ Cooking time
- ✓ Packaging
- ✓ Length of storage

Functions of some important vitamins and minerals and their sources

Micronutrients	Functions	Sources
Vitamin A	Important for normal vision, the immune system, reproduction and disease prevention.	Plant foods from dark green leafy vegetables to yellow or orange colored fruits and vegetables, liver, eggs, milk and dairy products

Vitamin B_1	Proper nerve functioning, important during pregnancy, breastfeeding and adolescence.	Moderate amounts in all nutritious foods, wholegrains, wheat and products, meat, fish
Vitamin C	Resistance to infection, helps absorption of iron, wound healing, repair and maintain cartilage, bones, and teeth.	Dark green vegetables, citrus fruits, guava, peppers, mangoes, potatoes, broccoli
Folate (Folic acid)	Production and maintenance of new cell, important during pregnancy to prevent neurological and birth defects and during infancy.	Fortified grains, leafy green vegetables, legumes, and seeds, liver, meat and dairy products
Calcium	Builds strong bones and teeth, promotes muscles and nerves functions, regulating heart beat and muscle contraction	Milk and dairy products, dark green leafy vegetables, seeds, soybean curd, tofu and bony fish
Iron	Important for healthy blood circulation, transport of oxygen through the body	Dark green leafy vegetables, red meat, poultry, legumes,
Iodine	Thyroid hormone functioning, prevents goiter, regulates metabolic rate, normal growth and development of brain	Iodized salt, seafoods, milk and dairy products, fortified foods, fruits and vegetables grown on iodine-rich soil

Questions and answers session

1. Identify which micronutrients in this food using food models, pictures or flashcards.
2. Do you think you get enough of the micronutrients from the foods you eat?
3. Do you eat a variety of different foods to be sure you get all of the micronutrients you need?
4. How can you add more foods rich in essential micronutrients to your meals?
5. Why it is important to consume iodized salt? Do you use iodized salt to prepare your meals?
6. Micronutrients matching games using food pictures

Expected outcomes

By the end of the sessions, the participants should be able to

- Recognize a healthy eating pattern
- Plan a balanced meal on a daily basis by modifying or adjusting their habitual dietary patterns
- Understand the importance of choosing foods from different food groups
- Avoid unhealthy heating behaviors
- Distinguish which food belongs to which food groups and contains which micronutrients
- Recognize vitamins or minerals and their function for health
- Replace better ingredients when cooking such as iodized salt, fresh vegetables, natural herbs, spices and condiments etc.

Additional references for Module 3: Promoting Healthy Eating

Myanmar cuisines include dishes from various regions of the country. The diversity of Myanmar cuisines has also been contributed by the myriad of local ethnic minorities as well as traditional and religious beliefs. Since Myanmar is incredibly diverse and each region has its own ethnicity, influence and language, different types of regional foods can be found across the country. Generally, Myanmar people consume more rice per person than any country in the world together with various selection of curries. A typical Myanmar meal is arranged around rice with accompanying curry as main dish with a side dish and soup.

Moreover, food production in Myanmar has focused mainly on grain with limited emphasis on production of non-cereal crops such as legumes, vegetables fruits and animal food sources including fish, poultry and livestock. This has led to limited food group diversity and cereal-based consumption patterns. Our International Institute of Rural Reconstruction (IIRR) baseline data showed that many villagers lack diversity in their diets, and do not get enough protein or nutrient-dense foods. By addressing these challenges, farmers and their families will be supported to live healthier lives through nutrition education sessions considering the local food preferences.

Eating a healthy diet has a number of benefits that reach beyond than just supporting the weight balance. Eating foods from each of the core food groups provides energy, vitamins and minerals needed to support the proper functioning of the body and for physical and mental well-being. Moreover, healthy diet helps to protect against malnutrition in all its forms, as well as noncommunicable diseases (NCDs), including such as diabetes, heart disease, stroke and cancer. The exact make-up of a diversified, balanced and healthy diet will vary depending on individual characteristics (e.g. age, gender, lifestyle and degree of physical activity), cultural context, locally available foods and dietary customs. However, the basic principles of what constitutes a healthy diet remain the same. Therefore, typical Myanmar habitual dietary pattern may need some modifications in order to be more nutritious and healthful.

Many vitamins and minerals play key roles in energy metabolism, and the adverse effect of deficiencies of these components is well recognized and easily demonstrated. Subclinical deficiency, often of multiple micronutrients, is more difficult to recognize, and laboratory assessment is often complicated by the acute phase response. Clinical benefit is most likely in those people who are severely depleted and at risk of complications, and is unlikely if this is not the case. The best evidence for benefit is in critical illness, and in children in developing countries consuming a deficient diet (44). The impact of micronutrient malnutrition is established early in life, leading to growth stunting, lower cognitive abilities, lethargy and poor attention, and greater severity and rates of infection. These effects limit educational progress, physical work capacity and life expectancy, thereby reducing individual lifetime productivity

and the aggregate ability of the population to enhance its well-being and participate in national and global markets. Poverty and micronutrient malnutrition positively influence each other. This poverty micronutrient malnutrition trap requires outside inputs to change the state of development in developing countries. One of the underlying causes and fundamental constraints to solving the micronutrient deficiency problem is that non-staple foods, particularly animal products, tend to be the foods richest in bioavailable micronutrients, which the poor in many developing countries desire to eat but cannot afford to buy (46). Moreover, the basis of increased food production in poor countries, have displaced other traditional crops that are higher in iron and other limiting micronutrients needed for healthy lives. Economically, the World Bank and the US Agency for International Development have estimated that iron deficiency costs India and Bangladesh about 5% and 11% of their gross national product annually, respectively, enough all by itself to prevent these countries rapidly accelerating out of third world status, a prospect which historically if achieved results in a lowering of national birth rates (47).

More than 2 billion people worldwide suffer from micronutrient deficiencies. Vitamin A deficiency, iodine deficiency disorders, and iron deficiency anemia are the most widely recognized, whereas the importance of zinc, vitamin B-12, folate and several other micronutrients warrants additional attention (48). Iron deficiency anemia is by far the greatest micronutrient problem affecting more than 2 billion people worldwide; in Africa and Southeast Asia, two-thirds of preschoolers and around half of all pregnant women are anemic (49). Anemia is also documented in 52% of pregnant women, 39% of children aged 4 years and 48% of children aged 5-14 years in developing countries. Despite some success in some regions from iodized salt campaigns, one third of the world's population is said to be at risk from goiter caused by iodine deficiency disorders. Globally, 740 million people are affected with goiter (50).

Vitamin A deficiency is a major health problem in more than 60 countries. The World Health Organization Micronutrient Deficiency Information System (WHO-MDIS) reported that in 1995, 29 million children aged of 5 years had clinical vitamin A deficiency. Annually, 250,000-500,000 preschool children are estimated to experience blindness from this deficiency and about two-thirds of these children die within months due to blindness. A similar number of children have insufficient iodine intake, which significantly impairs their cognitive development (17). FAO data suggest that more than half of the world's population is at risk of low zinc intakes (46). In Peru and Indonesia, studies have suggested that among pregnant and postpartum women, the prevalence of zinc deficiency was 60% and 24%, respectively (48). The Child Nutrition Project of the GL-CRSP found that intakes of vitamin B-6 and vitamin B-12 in young children and women of reproductive age in rural Kenya were below two thirds of the RDA (51).

Myanmar is a developing country where 80% of the world's malnourished children live. The country has been facing three major micronutrient deficiencies which are iodine, iron and vitamin A deficiencies. The three micronutrient deficiencies can cost about 2.4% of the country's GDP (52). Thiamine (B1) deficiency has been identified as a concern in Myanmar, being the fifth leading cause of death among infants. According to a 2013 Ministry of Health report, adequately iodized salt coverage decreased dramatically from 73% in 2005 to 47% in 2008, indicating that iodine deficiency may be an issue in parts of the country. Vitamin A deficiency has been estimated to affect nearly a third of preschool-age children, according to the UNSCN (2010), although other reports indicate that vitamin A deficiency affects 4% or less of preschool-age children in Myanmar.

The deficiencies are contributing to lethargic national development efforts, continued high population growth rates, and a vicious cycle of poverty for massive numbers of underprivileged people in all nations. Food systems globally are not providing enough balanced nutrient output to meet all the nutritional needs of every person, especially resource-poor women, infants, and children in developing countries and agriculture is partly responsible (53). Educational campaigns that stress the importance of a diversified diet are vital. Simply helping consumers to understand the interactions between products they ingest could improve overall nutritional status of the individuals. In a study in Nepal, only 38.1% of participants in a nutrition and gardening development project and 13.3% of controls (nonparticipants) were able to identify the cause of night blindness even though the condition is widely recognized in this region (54). Education that engages civil society in ways that encourage the public to be active participants in the demand for micronutrient adequacy, not just the ''target'' of imposed interventions, is a most effective way to intervene (55).

Modern agricultural systems are adept at providing calories, but in the process, they have increased hidden hunger among the world's poor by displacing acreage allotted to traditional crops such as pulses, making many micronutrient-rich plant foods less available and more expensive to low-income families (56). Animal products (such as beef, pork, lamb, poultry, and fish) and many fruits and vegetables contain high levels of micronutrients that can also counteract the negative effects of the antinutrients found in many staple plant foods, thereby promoting the bioavailability micronutrients in mixed diets (57).

In many developing nations, animal meats, fruits, and vegetables are not continually available throughout the year especially to low-income families. Therefore, they contribute insufficiently to meeting the continuous nutritional needs of vulnerable populations because these foods are seasonal, expensive, or both (58). Thus, greatly increasing the production of small animals, fruits, and vegetables and the infrastructure to process and provide these foods on a continuing basis to those most in need would have a significant effect on improving the micronutrient status of people in many regions of the world. Accordingly, many nations have

adopted solutions to micronutrient malnutrition that only stress supplementation and food fortification intervention programs (59). Although many of these programs have been successful in the short run, they are all too often unsustainable for economic, political, and logistical reasons (60).

Nutrition Education Module 4: Promotion of Breastfeeding and Appropriate Complementary Feeding

Materials needed:

- White board
- Markers
- Pictures
- Educational posters

Methods:

- Active learning process which involves reciprocal questioning, demonstration, role playing

Objectives

- To provide breastfeeding education in an effort to promote the provision of consistent information to the villagers
- To improve the breastfeeding knowledge and awareness of the participants
- To understand the importance of breastfeeding, and the consequences of not breastfeeding, in terms of health outcomes.
- To provide appropriate education and training to enable to promote, protect and support breastfeeding
- To develop public acceptability and the promotion of breastfeeding
- To understand the importance of exclusive breastfeeding for the first six months of life and possess the knowledge and skills to enable mothers to achieve this
- To improve knowledge and understanding of complementary feeding and appropriate practices
- To understand the importance of timely introduction of complementary foods and of continuing breastfeeding during the weaning period, into the second year of life and beyond.

Procedures

This program is mainly composed of lecture session in which the facilitator provides information of breastfeeding (emphasizing that exclusive breastfeeding is the practice of feeding a child only breast milk and no other food or drinks from the first hour of birth until six months old), complimentary feeding and healthy first foods by using educational aids such as

white board, markers, pictures, and educational posters. The session will be followed by interactive discussions and reciprocal questioning session at the end.

Time required: 3 hours

Teaching session outlines

Babies who are breastfed have many health advantages over others fed other types of milks or formulas. Breastmilk contains the perfect amount of protein, fat, carbohydrate and other nutrients for the growth and development of newborns. Since breastmilk is perfect for babies, it is recommended to feed only breastmilk for the first six months of life and that mothers breastfeed for as long as they can. **Giving only breastmilk (exclusive breastfeeding) means not giving other foods or liquids to the infant for the first six months after birth, with the exception of vitamin and mineral supplements or medicines.**

Benefits of breastfeeding to infants (28, 61, 62)

- Colostrum is the first form of milk produced by the mammary glands immediately following delivery of the newborn.
- Colostrum contains antibodies and is important for promotion of health and prevention against diseases.
- Human milk is specially designed to meet all the nutrition requirements such as carbohydrate, fat, protein, vitamins, minerals, hormones and digestive enzymes and as an optimal nutrition source.
- Antibodies from mother passes to infant via breast milk thereby increasing the immunity of the infant and help the infant to resist diseases and help improve normal immune response to certain vaccines.
- Studies suggested the protective effects of breastfeeding against gastrointestinal, respiratory and urinary tract infections and it can reduce asthma, allergies and incidence of sudden infant death syndrome during the infancy period and also beyond.
- Diarrheal diseases are 3 to 4 times less likely to occur in breastfed infants when compared to formula fed infants.
- Breast milk has anti-inflammatory, antibacterial properties and can also eliminate the exposure to pathogens that may be introduced through the preparation and delivery of formula feeding.
- Breastfeeding is protective against chronic diseases such as ischemic heart disease, atherosclerosis, celiac disease and diabetes.
- Breastfeeding is also economical, convenient, safe and increase the bonding between mother and infant.

- Breastfed infants have lower prevalence of obesity in later life than formula fed infants.
- Breastfeeding still remains the preferred mode of feeding for infants in almost all the difficult circumstances including low birth weight or preterm infants, HIV infected mothers, malnourished infants, adolescent mothers, etc.
- If the breastfeeding technique is satisfactory, exclusive breastfeeding for the first 6 months of life meets the energy and nutrient needs of the vast majority of infants. No other foods or fluids are necessary.
- Several studies have shown that healthy infants do not need additional water during the first 6 months if they are exclusively breastfed, even in a hot climate.
- Breast milk itself is 88% water, and is enough to satisfy a baby's thirst. Extra fluids displace breast milk, and do not increase overall intake.
- However, water and teas are commonly given to infants, often starting in the first week of life. This practice has been associated with a two–fold increased risk of diarrhea (63).

Important facts

- Mothers who cannot breastfeed should consult a health care professional to plan appropriate replacement milk.
- Giving cow, goat or any other animal milk to a baby under one year of age is not an adequate replacement for breastmilk, as the nutrients in those milks are different from the nutrients needed by a human baby.
- Infant formulas available commercially can be a breastmilk substitute when necessary, but formula does not provide protection to the baby's immune system.
- Formula is usually expensive and requires clean water and sanitary conditions for proper preparation, cleaning of bottles and feeding.

Complementary feeding

- Should be started only at the six months of age, while continuing breastfeeding, because an infant's need for energy and nutrients starts to exceed more than breast milk.
- If complementary foods are not introduced when a child has reached 6 months, or if they are given inappropriately and of inadequate nutritional quality, an infant's growth may falter (64).
- Poor feeding practices can lead to impair nutritional status and childhood obesity later.
- Adequate and timely complementary feeding practices do not only regulate growth and functional developments, but also appear to play a pivotal role in lifelong programming effects that regulate health, disease, mortality risks, neural function and behavior, and quality of life in adulthood (65).

- The timing and type of complementary foods provided to infants is variable, depending on the cultural practices of the society, nutritional needs, immunological safety, environmental influences as well as the developmental maturation.
- Evidences suggested that introduction of foods before 4 months or later than 6 months have higher risks than benefits (28).
- It is important to introduce mixed food items such as cereals, rice, potatoes, meats, tofu, poultry, etc. rather than single foods and gradually increase food consistency and variety as the infant gets older, adapting to the infant's requirements and abilities.
- Infants can eat pureed, mashed and semi-solid foods beginning at six months.
- By 8 months, most infants can eat "finger foods" (snacks that can be eaten by children alone).
- By 12 months, most children can eat the same types of foods as consumed by the rest of the family with avoidance of foods that may cause choking such as nuts, grapes, raw carrots or high allergenic foods (66).

Guiding principles for appropriate complementary feeding

- Continue frequent, on-demand breastfeeding until two years of age or beyond
- Practice responsive feeding
- Practice good hygiene and proper food handling
- Start at six months with small amounts of food while continuing breastfeeding
- Gradually increase food consistency and the variety of foods as the child grows older, adapting to the infant's requirements and abilities.
- Increase the number of times that the child is fed: 2-3 meals per day for infants 6-8 months of age and 3-4 meals per day for infants 9-24 months of age, with 1-2 additional snacks as required
- During illness, increase fluid intake including more breastfeeding, and offer soft, favorite foods
- Complementary foods should be given in amounts, frequency, consistency and using a variety of foods to cover the nutritional needs of the growing child while maintaining breastfeeding
- Foods should be prepared and given in a safe manner that measures are taken to minimize the risk of contamination
- Feeding young infants requires active care and stimulation, where the caregiver is responsive to the child clues for hunger and also encourages the child to eat which is also referred to as active or responsive feeding. (64)

According to complementary foods at six months of age in addition to breast milk, foods should be adequate, meaning that they provide sufficient energy, protein and micronutrients to meet a growing child's nutritional needs. Infant should be fed with thick porridge, well mashed foods. Usually baby in this age should start feeding solid food and breast milk 1–2 meal per day. The protein requirement of the 6–month–old infant is 75% higher than in the adult due to growing requirements (67, 68).

Healthy first foods

- Starchy foods alone are not the best first foods for babies because they do not provide enough protein, calories and other nutrients to meet the needs of the rapidly growing baby.
- Foods from all food groups – meats, dairy, fruits, vegetables, grains should be included in the complementary foods.
- Starchy staple foods that are part of the local diet can be enriched to make good first foods by adding small amounts of shredded, chopped or pounded foods from other food groups together with a small amount of oil.
- The foods require special preparation to make sure they are clean, soft and easy to eat and digest.
- They should be mashed and diluted to prevent choking.
- When the child is accustomed to liquid and soft foods, and as teeth appear, semi–solid and then solid foods can be added to the diet.
- Foods should be prepared without added salt, as babies cannot yet process it (44).

Complimentary feeding should include

- Proteins from plants (beans, lentils, peas) and animals (meat, chicken, fish, eggs)
- Staples (maize, wheat, rice,)
- Roots and tubers (taro, pumpkin, cassava, potatoes)
- Milk and milk products
- Vitamin A–rich fruits and vegetables (mango, papaya, carrots, sweet potato, pumpkin and oranges)
- Dark green leafy vegetables
- Other fruit and vegetables (banana, pineapple, watermelon, tomatoes, eggplant, cauliflower and cabbage)
- Moderate amount of healthy fats

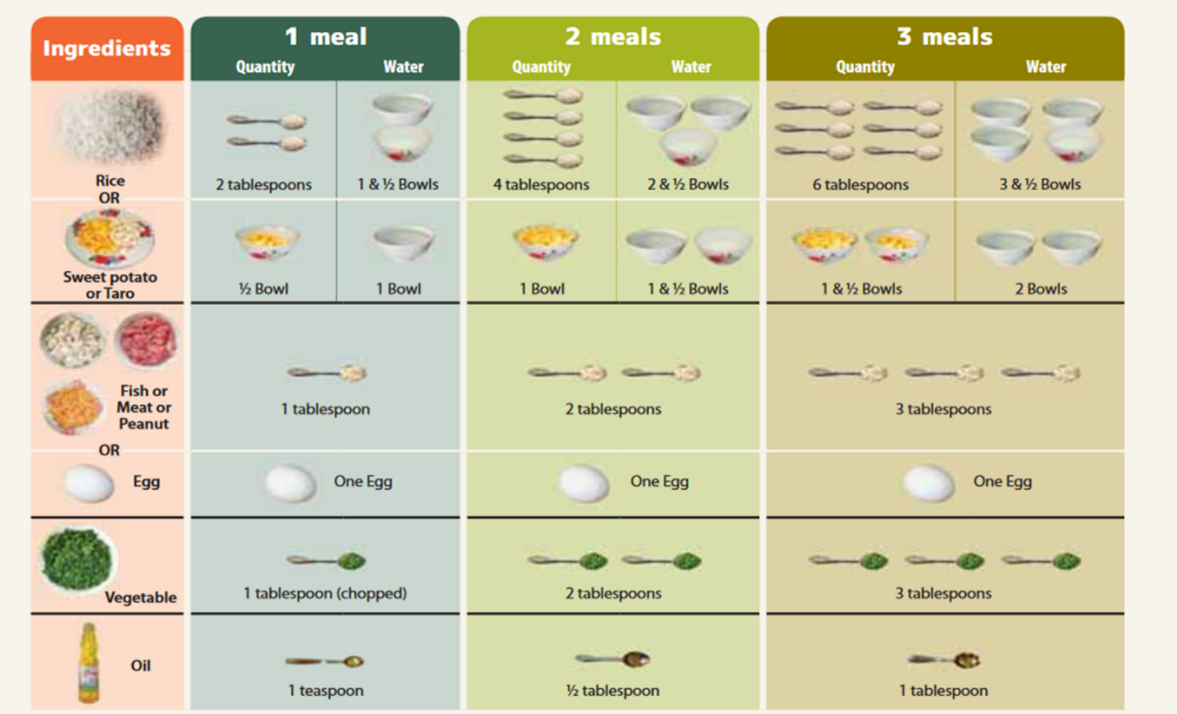
Questions and answers session

1. When is the correct age to stop breastfeeding?
2. When is the correct age to introduce complementary feeding?
3. What is the minimum frequency of giving complementary food in a day depends on age of a child?
4. Are you breastfeeding your baby?
5. If no, what replacement are you giving the baby?
6. When did you stop breastfeeding?
7. How often do you feed the baby?
8. Do you give only breastmilk to the baby?
9. If no, what else do you give the baby?
10. When did you start to give the baby other liquids or foods?
11. How do you prepare the additional foods you give the baby?
12. Do you think your baby is growing and developing well?
13. Do you have your baby weighed regularly to check weight gain?

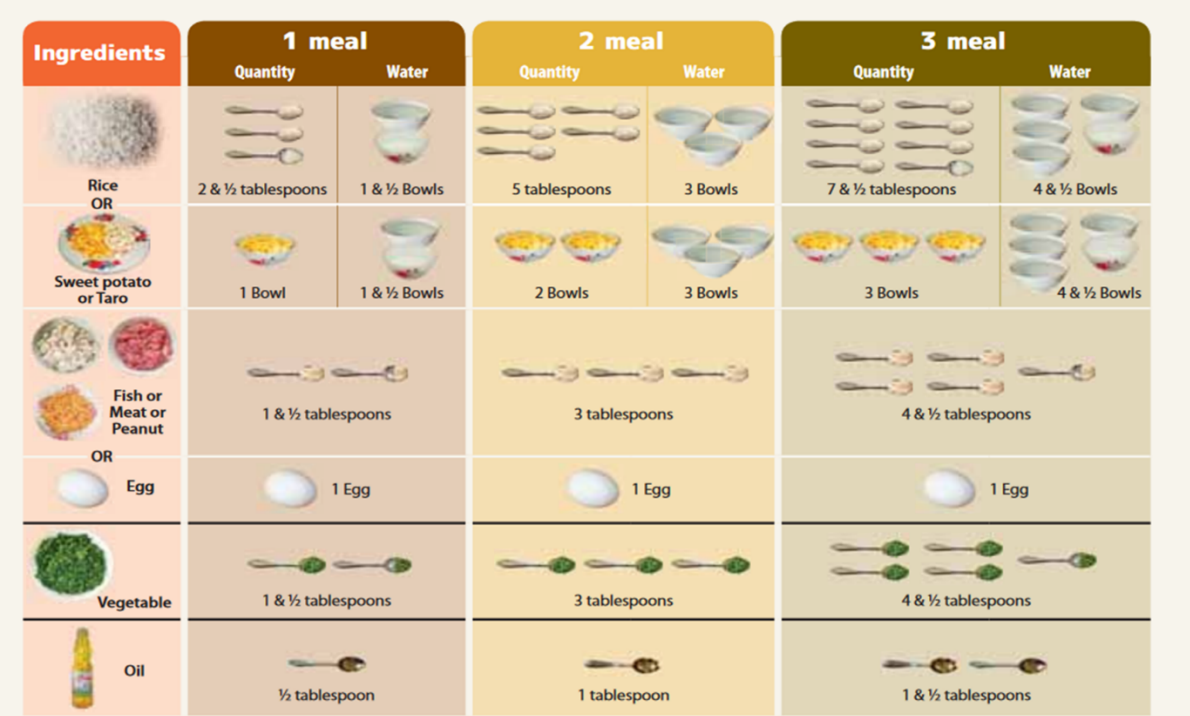
Expected outcomes

At the end of the session, the participants will be able to

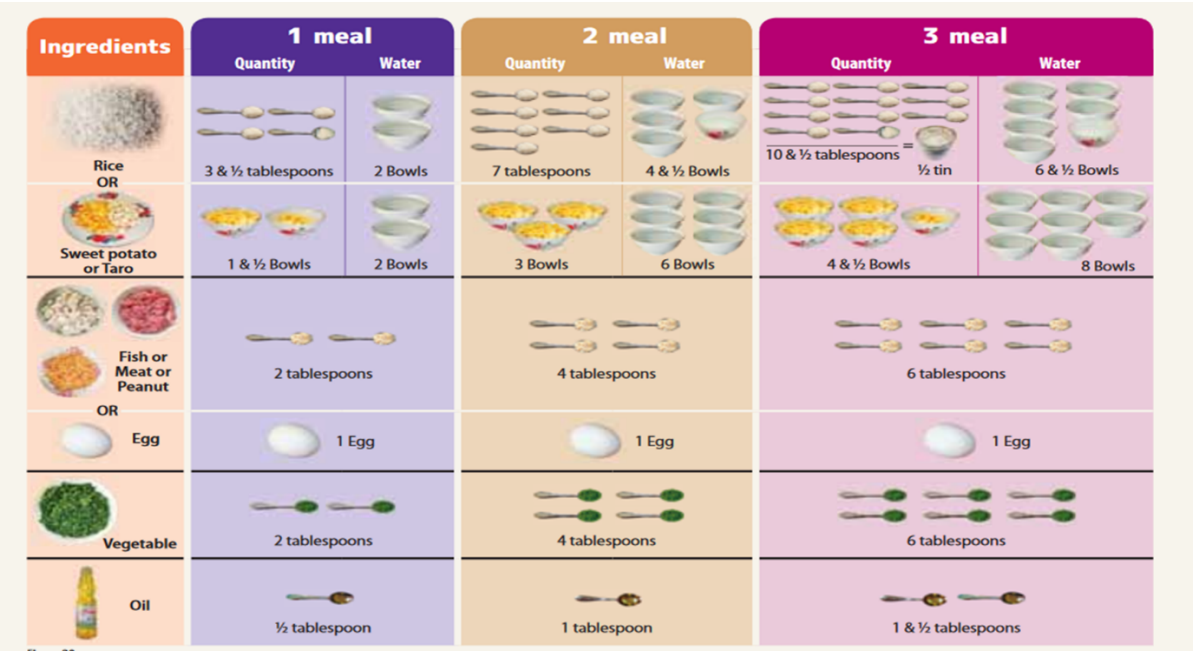
- Understand why they should breastfeed their children
- Realize the benefits of exclusive breastfeeding
- Describe complementary feeding
- Explain the importance of complementary feeding
- Enumerate optimal complementary feeding practices.



Complementary foods for 6–8 months



Complementary foods for 9–11 months



Complementary foods for 12–24 months

Nutrition Education Module 5: Recipe Demonstrations

Introduction

When nutrition education and messages are delivering to the communities, the participants have failed to absorb the information and effectively benefit from the programs because nutrition advice and knowledge are difficult for them to understand and cooperate into daily practice especially when the literacy rate is low and poverty is prevalent. Therefore, the intervention programs should be designed to help families with limited resources to make food choices which are available, affordable and accessible to them so that it will help to improve their dietary patterns and overall wellbeing. This can be achieved by providing hands-on learning activities, demonstrations and discussions.

In this program, the villagers will be educated using cooking demonstrations by nutritionist and community health workers. Participatory cooking demonstrations can be a powerful tool to help families plan and prepare nutritious meals, select appropriate food sources, handle food safely and learn about the nutritional needs of family members throughout their life-cycle. Moreover, nutritious, diverse diets are essential for infants and young children to ensure optimal physical growth, cognitive development, health and well-being.

The Food and Agriculture Organization of the United Nations experienced that participatory food demonstrations can be a powerful motivational tool for positive behavior change resulting in better dietary quality and tangible nutritional outcomes. In resource-poor environments, food demonstrations are most likely to result in positive nutritional benefits if they are combined with a broader range of food production activities targeted to women, such as home gardens, small-animal raising, and the development of appropriate food processing and preservation skills.

Materials needed

- Cooking utensils
- Food ingredients (based on recipes)

Methods

1) "Cooking with IIRR" consists of 3 practical sessions for recipe demonstrations including food preparation techniques, meal planning and tasting of foods which are designed to increase energy and nutrient density by making better use of traditional/ local recipes.
2) Recipe demonstrations program, will be conducted based on most commonly eaten dishes in the particular area/ community.
3) Recipes will be chosen that conform to local eating patterns and adjust if needed

4) The cooking procedures of the selected 3 recipes should not be too complicated and ingredients should be widely available.
5) The nutritional components of the selected ingredients and how to minimize nutrient losses while cooking will be explained verbally during the same time of demonstrations.
6) The local recipes will be modified and added more ingredients to improve overall nutritional quality and to meet the adequate calorie requirements of the individuals.

Objectives

- To develop and test the acceptability and feasibility of nutritious recipes for young child and family feeding and to develop confidence to prepare nutritious and healthful meals
- To promote healthy eating and improve family and complementary feeding practices
- To motivate and empower families and mothers to adopt the suggested improvements
- To improve feeding practices and nutritional status of the family through the development nutritious local recipes based on locally available and affordable foods by using food demonstrations as a practical tool for nutrition education.
- To establish a system of peer learning through the promotion of nutritionally–sound indigenous knowledge and skills
- To promote and facilitate dietary diversification and adoption of improved family feeding practices by communities
- To help people to develop new attitudes and confidence that they need to improve their nutritional habits and how to feed their families
- To encourage local people to learn more about how to prepare a variety of dishes with high nutritional values and the importance of good hygiene

Program outlines

- The villagers will be allowed to participate in the recipe development and contribute their knowledge from previous modules and the cooking skills as well as their cooking utensils and food ingredients where possible.
- The steps and nutritional messages including nutritive values of the ingredients used are clearly explained during the demonstration.
- All participants should be able to join in meal preparation by cutting, cleaning and mixing the ingredients and cooking different dishes using readily available local foods in line with healthy and balanced nutrition goals and also encourage them to ask questions and offer suggestions.
- This involves learning about combining diverse foods to enhance nutritional value and variety, adding ingredients in the right proportions by using local measures, ensuring correct cooking times and handling and storing foods safely.

- Participants also taste the cooked food and evaluate the taste, appearance, smell and acceptability based on local preferences.
- Testing different recipes under real life conditions enables modifying and refining them in line with community and household capacities and needs.

Time required: 4 hours

Expected outcomes

At the end of the session, the participants are expected to

- Prepare nutritionally improved dishes in terms of diversity, quality or quantity
- Gain new food preparation skills using locally available and affordable ingredients
- Develop knowledge, practical skills and confidence in preparing improved or new nutritionally sound dishes
- Create awareness of nutritious food ingredients readily available at home or in the area
- Improve and diversify family feeding practices and food intake, with a specific focus on improving the nutritional quality of the diets

Nutrition Education Module 6: Improved Sanitation Practices

Introduction

Inadequate sanitation has direct effect on health of individual, family, communities and nation as a whole. Food borne diseases are illness caused by consuming contaminated food or drink. The contamination can occur anywhere from farm to the plate and can lead to a variety of avoidable infectious diseases. The high prevalence of food borne illness at home could be attributed to poor food hygiene and preparation due to poor awareness of proper practices. Contaminated foods contribute to poor health outcomes and impact 1 in 10 people globally each year. An estimated 420,000 people die each year from contaminated foods, 30 percent of whom are children under 5 years, with the highest death rates occurring in Sub–Saharan Africa and Asia. The many sources and forms of contaminated foods include poor production, post–harvest, storage practices and food handlings etc. (69). Access to sanitation facilities and literacy rate of women are also strong factors affecting malnutrition children in low income countries.

Fresh and clean foods are important for good nutrition. Foods need to be grown and handled properly so that they provide the best nutritional quality possible. Most illnesses from eating contaminated or spoiled food can be avoided if food is handled, prepared, cooked and stored properly and if basic cleanliness and personal hygiene practices are followed. Food needs to be kept safe during growing, harvesting, moving from the field, processing, storing, selling, and finally preparing and eating it. Knowing how to choose good foods in the shops and how to store and prepare food safely at home can protect the safety and quality of the foods.

Preparing and cooking food properly can help protect the nutrients in foods. Nutrients are affected by contact with air, heat, light and chemicals. It is important to cook foods with sufficient heat to kill harmful bacteria, but it is also important not to destroy the nutrient content of foods by overcooking. When foods are boiled for a long time, many of the important nutrients dissolve in the cooking water. If the cooking water is thrown away and not eaten, fewer nutrients will be consumed. Correct food preparation and cooking will help ensure the nutritional quality and safety of foods and meals prepared for the family members.

Materials needed

- Water
- Soap
- Educational posters

Objectives

- To understand the level of awareness about hand hygiene including critical times for handwashing, appropriate way to clean hands and importance of handwashing
- To minimize the risk of food borne illness
- To ascertain access to hand hygiene facilities at the household level, with a focus on presence of a designated place to wash hands and presence of water and soap at the designated place
- To educate the villagers how to prepare foods safely and hygienically
- To promote the awareness and practice of food safety at home among the population

Program outlines

- Lecture session in which the facilitator is delivering the information of hand hygiene promotion measures, benefits of handwashing, when/ how to wash hands properly and safe steps in personal hygiene precautions.
- Practical session in which the facilitator is demonstrating how to wash hands in front of the participants and let each participant engage in the activity.
- Questions and answers sessions

Time required: 3 hours

Benefits of hand washing using soap

- Prevention and control of the spread of communicable diseases and infections such as flu, diarrhea, hepatitis etc.
- Reduce the risk of cross-transmission of infections and illnesses

Necessary items for hand washing with soap

- Soap (any type of soap can be used, including soap bar, liquid soap or sanitizers)
- Clean water

Soap is important

- Washing hands with soap and water is the best way to remove substantially more disease-causing organisms than washing hands with water alone.

Handwashing (Centers for Disease Control and Prevention)

When to Wash?

- Before, during, and after preparing food

- Before eating/ drinking
- Before and after caring for someone at home who is sick with vomiting or diarrhea
- Before and after treating a cut or wound
- After using the toilet
- After changing diapers or cleaning up a child who has used the toilet
- After blowing the nose, coughing, or sneezing
- After touching an animal, animal feed, or animal waste
- After handling pet food or pet treats
- After touching garbage
- After using tobacco

7 Steps to Wash Your Hands Properly

Step 1 – Wet your hands and apply enough soap.

Step 2 – Rub your palms together.

Step 3 – Rub the back of each hand.

Step 4 – Rub both your hands while interlocking your fingers.

Step 5 – Rub the back of your fingers.

Step 5 – Rub the tips of your fingers.

Step 6 – Rub your thumbs and the ends of your wrists.

Step 7 – Rinse both hands properly with water.

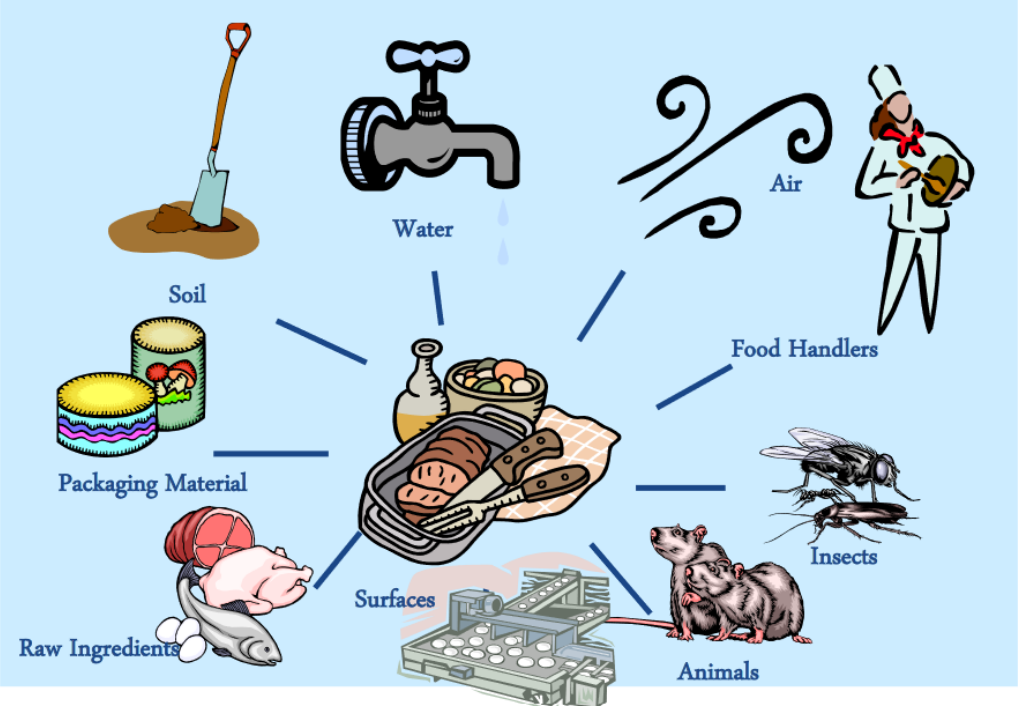
Step 8 – Dry your hands using a clean towel or air dry them

Safe steps in food handling, cooking, and storage together with personal hygiene precautions

- Use clean water to prepare and cook the dishes.
- Wash surfaces, cutting boards and utensils before cooking and after cooking.
- Wash vegetables and fruits with clean water. Peel if possible.
- Cover foods and store utensils in a clean place.
- Cover all foods to keep flies, dust and dirt away.
- Don't cross-contaminate. Keep raw meat, poultry, fish, and their juices away from other ready-to-eat foods, fresh foods, fruits and vegetables.
- Cooking at right temperature to prevent foodborne illnesses.
- Cook or reheat food properly, avoiding overcooking which can destroy nutrients.

- Cook or steam vegetables with as little water as possible, rather than boiling them.
- Dry, non–perishable foods, such as flour, salt, sugar, legumes (beans, lentils), grains (rice, maize, oats) and seeds should be kept in a dry, clean place free from insects, rodents or other animals.
- Serve and eat vitamin A–rich plant foods with some fat to help improve absorption of vitamin A. For example, cook pumpkin and carrots with a small amount of oil.
- Prepare and eat iron–rich plant foods with vitamin C–rich foods to help absorption. For example, eat leafy green vegetables and salads with a lemon juice.
- Recognizing the signs of good or spoiled foods such as leakage, presence of molds, bad smell or unusual taste.
- Avoid drinking, smoking and eating while preparing and cooking food. Also avoid sneezing or coughing on food and scratching or touching the head and body.
- Keep rubbish in a covered bin and empty frequently.
- Use clean, properly constructed latrines

Sources of Microorganisms



How to Handwash?

WASH HANDS WHEN VISIBLY SOILED! OTHERWISE, USE HANDRUB

Duration of the entire procedure: 40-60 seconds

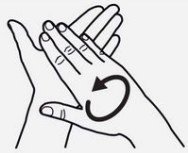
0

Wet hands with water;

1

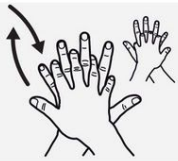
Apply enough soap to cover all hand surfaces;

2



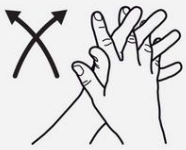
Rub hands palm to palm;

3



Right palm over left dorsum with interlaced fingers and vice versa;

4

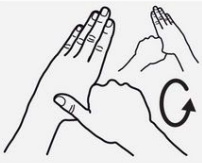


Palm to palm with fingers interlaced;

5

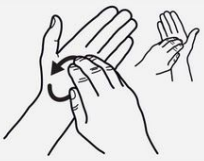
Backs of fingers to opposing palms with fingers interlocked;

6



Rotational rubbing of left thumb clasped in right palm and vice versa;

7



Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa;

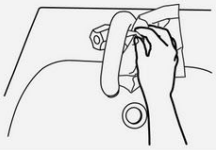
8

Rinse hands with water;

9

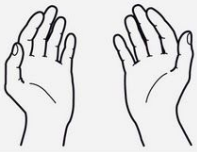
Dry hands thoroughly with a single use towel;

10



Use towel to turn off faucet;

11



Your hands are now safe.

World Health Organization

Patient Safety

A World Alliance for Safer Health Care

SAVE LIVES
Clean **Your** Hands

WHO acknowledges the Hôpitaux Universitaires de Genève (HUG), in particular the members of the Infection Control Programme, for their active participation in developing this material.

May 2009

Questions and answers session

Questions	Answers
What is a clean hand?	A clean hand looks clean, have no odor and is free of dirty matters
Why should we wash our hands with soap regularly?	To remove dirt and germs
Why should we wash our hands with soap before meals?	To remove bacteria and other pathogens from getting into our body via mouth through the hands
Why should we wash our hands with soap before preparing food?	To avoid contamination of foods
Why should we wash our hands with soap before breastfeeding the child?	To avoid spreading infections from our hands to the child's mouth
Why should we wash our hands with soap after touching poultry?	To avoid contacting microorganisms from the poultry to our body
Where should we put soap and clean water for convenient hand washing with soap?	In the kitchen and toilet areas

Expected outcomes

At the end of the session, the participants are expected to

- Understand the importance of sanitation practices
- Wash the hands properly using clean water and soap or ash
- Increase the knowledge of safe food handling, cooking, and storage together with personal hygiene precautions